DIV. OF FISHES

UNIVERSITY OF MICHIGAN
DEC 1
MUSEUM LIBRARY

COMMERCIAL FISHERIES REVIEW

VOL. 26, NO. 11 NOVEMBER 1964

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
STEWART L. UDALL, SECRETARY

FISH AND WILDLIFE SERVICE
CLARENCE F. PAUTZKE, COMMISSIONER

BUREAU OF COMMERCIAL FISHERIES
DONALD L. MCKERNAN, DIRECTOR

DIVISION OF RESOURCE DEVELOPMENT
RALPH C. BAKER, ASST. DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

Publication of material from sources outside the Bureau is not an endorsement. The Bureau is not responsible for the accuracy of facts, views, or opinions contained in material from outside sources.

Although the contents of the publication have not been copyrighted and may be reprinted freely, reference to the source is appreciated.

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, May 1, 1963.

5/31/68

CONTENTS

COVER: Shows a larval swordfish being taken from a pan containing other larval fish including marlin, tuna, and barracuda. The specimens were taken in plankton tows by the research vessel John Elliott Pillsbury of the Institute of Marine Science, University of Miami, while conducting oceanographic investigations in the Tropical Atlantic between the northeast Bahamas and Bermuda. (Also see pp. 48-50 of this issue.)

Page
1 . . Preliminary Report on Experimental Smoking of Chub (Leucichthys sp.), by Max Patashnik, Charles F. Lee, Harry L. Seagran, and F. Bruce Sanford
12 . . Age Composition of the Commercial California Bluefin Tuna Catch in 1963, by Peter A. Isaacson

Page
TRENDS AND DEVELOPMENTS:
Alaska:
15 . . Handling and Processing Aboard Japanese Vessels of Alaska Salmon
15 . . Foreign Fishing Activities Off Alaska
16 . . Kodiak has Excellent Salmon Season
16 . . Kodiak Processing Plant Very Active
17 . . Good Progress in Herring Reduction
17 . . Ample Supplies for Crab-Processing Plants
17 . . Cordova Dungeness Crab Prices Drop
17 . . Filing of Fishery Disaster Loan Applications Extended to October 31, 1964
Alaska Fisheries Explorations and Gear Development:
17 . . Shrimp Explorations Off Alaska
Alaska Fishery Investigations:
19 . . Copper River Sockeye Salmon Serological Sampling
19 . . Naknek System Red Salmon Smolt Outmigration
19 . . Karluk Lake Salmon Escapement
20 . . Crab Tagging Program
20 . . Olsen Bay Pink Salmon Run, 1964
20 . . Transplanting Live Pink Salmon
20 . . Studies on Migrations of Juvenile Salmon

Page
TRENDS AND DEVELOPMENTS (Contd.):
American Fisheries Advisory Committee:
21 . . Fisheries Problems to be Discussed At 18th Annual Meeting
American Samoa:
21 . . American Samoan-Based Tuna Fleet Dwindling
California:
21 . . San Franciso Bay Investigations Continued
23 . . Abalone Observations and Growth Studies
23 . . Albacore Tuna Migration Studies and Tagging
24 . . Pelagic Fish Population Survey Continued
Cans--Shipments for Fishery Products, January-July 1964
Central Pacific Fisheries Investigations:
25 . . Swimming Behavior of Tuna and Mackerel Studied
26 . . Skipjack Tuna Blood-Typing Studies Expanded
27 . . Trade Wind Zone Oceanographic Studies Continued
Export Opportunity:
28 . . New Sample Display Service Offers Export Development Opportunity
Federal Purchases of Fishery Products:
28 . . Department of Defense Purchases, January-August 1964

Contents continued page II.

CONTENT (CONTINUED)

Page

TRENDS AND DEVELOPMENTS (Contd.):
Foreign Fishery Reporting:
29 .. United States Fishery Attache Program in Foreign Countries
Freezing:
30 .. Use of Liquid Nitrogen to Freeze Fish Studied
Fur Seals:
30 .. Pribilof Islands Fur Seal Skin Harvest, 1964
Great Lakes Fisheries Exploration and Gear Development:
30 .. Studies on Trawling of Commercial Species in Lake Superior Continued
33 .. Seasonal Distribution and Abundance Studies of Alewife, Chub, and Yellow Perch in Lake Michigan Continued
Great Lakes Fishery Investigations:
33 .. Lake Erie Yellow Perch Landings Down Sharply in 1964
Gulf Fishery Investigations:
34 .. Shrimp Distribution Studies
Gulf States Marine Fisheries Commission:
35 .. Annual Meeting in Brownsville, Texas
Industrial Fishery Products:
U.S. Fish Meal, Oil, and Solubles:
35 .. Production by Areas, August 1964
35 .. Production, July 1964
36 .. Major Indicators for U.S. Supply, July 1964
U.S. Fish Meal and Solubles:
36 .. Production and Imports, January-July 1964
36 .. Menhaden Catches North of Chesapeake Bay Decline
37 .. U. S. Fish Oil Production Forecast for 1964
Inventions:
37 .. Shrimp Head and Vein Removing Tool Patented
Louisiana:
37 .. Fishery Landings, 1963
New York City:
40 .. Relocation of Wholesale Fulton Fish Market Recommended
North Atlantic Fisheries Exploration and Gear Research:
41 .. Surf Clam Survey Continued
42 .. Whiting Escapement Study
43 .. Electrical Fishing Tests Continued
North Atlantic Fisheries Investigations:
44 .. Summer Distribution and Abundance of Groundfish Species Studied
46 .. Continental Shelf Waters Surveyed
North Pacific Fisheries Explorations and Gear Development:
46 .. Survey of Deep-Water Marine Fauna Off Mouth of Columbia River Continued
47 .. Experimental Fishing with "Cobb" Pelagic Trawl
Oceanography:
48 .. Larval Specimens of Tuna, Swordfish, and Marlin Collected in the Tropical Atlantic
50 .. Exchange Visits by United States and Soviet Oceanographers
50 .. Small Portable Marine Work Platform with Derrick
Oregon:
51 .. Metolius Salmon Hatchery Closes and Experimental Hatchery Station Opens
Oysters:
51 .. Light Strike in James River Seed Beds in 1964

Page

TRENDS AND DEVELOPMENTS (Contd.):
Oysters (Contd.):
52 .. Development of Disease-Resistant Oyster Strains
Pesticides:
52 .. Stringent Rules Ordered in Use of Pesticides on Lands Administered by Department of the Interior
Preservation:
53 .. Shelf Life of Frozen Fish Studied
Radiation Preservation:
54 .. Acceptance Tests Conducted for Petrale Sole Fillets
54 .. Irradiation of Fish at Sea Planned
Shrimp:
55 .. United States Shrimp Supply Indicators, September 1964
South Carolina:
55 .. Fisheries Biological Research Progress, July-September 1964
Tropical Atlantic:
57 .. Results of Fishery-Oceanographic Studies in Gulf of Guinea
United States Fisheries:
58 .. Commercial Fishery Landings, January-August 1964
U.S. Fishing Vessels:
58 .. Emergency Medical Help Instructions for Fishermen
Documentations Issued and Cancelled:
59 .. July 1964
60 .. June 1964
61 .. Fisheries Loan Fund and Other Financial Aid for Vessels, July 1-September 30, 1964
61 .. New Small Stern-Trawler Canyon Prince
U.S. Foreign Trade:
63 .. Airborne Imports of Fishery Products, January-May 1964
63 .. Imports of Canned Tuna in Brine Under Quota
63 .. Processed Edible Fishery Products, July 1964
Wages:
64 .. New Minimum Wages for Onshore Fishery Workers
Washington:
64 .. Survey of Fish and Wildlife Resources of Puget Sound and Adjacent Waters
Weather:
65 .. Storm Warning Buoys for Gulf of Mexico
Wholesale Prices:
65 .. Edible Fish and Shellfish, September 1964
FOREIGN:
International:
North Pacific Fisheries Convention:
67 .. Parties to the Convention Resumed Talks in Ottawa
67 .. Japanese Fishing Industry Position on Negotiations
68 .. Japanese Press Reaction to Talks
International Council for the Exploration of the Sea:
68 .. New Convention Approved at Conference in Copenhagen
International Convention on the Territorial Sea and Contiguous Zone:
70 .. Dominican Republic Ratifies Convention

Contents continued page III.

DEPOSITED BY THE
UNITED STATES OF AMERICA

CONTENT (CONTINUED)

Page

FOREIGN (Contd.):
International (Contd.):
Fish Meal:
71 .. Production and Exports for Selected Countries, January-June 1963-1964
71 .. World Production, June 1964
Organization for Economic Cooperation and Development:
71 .. Bureau Meeting of Fisheries Committee Held
Food and Agriculture Organization:
71 .. Fishery Training Center to be Built in South Korea
Whaling:
72 .. Soviets Propose Conference for Revision of Antarctic Catch Allocation
Argentina:
72 .. Fisheries Trends, 1963-1964
Australia:
75 .. Facilities Expanded to Handle Increased Tuna Catch
76 .. Joint Ventures with Japanese in Shrimp Farming and Tuna Fishing in Australia Considered
76 .. Shrimp Fishery Good in 1964
76 .. Increase in Scallop Exports Planned
77 .. Scallop Fishery Expands
79 .. Exporting Pet Food to the United States
79 .. Standards for Oysters Proposed
Canada:
79 .. Federal-Provincial British Columbia Fisheries Committee Established
79 .. Federal-Provincial Atlantic Fisheries Committee Meeting in Ottawa
79 .. New Chart of Nova Scotia Fishing Banks
Ceylon:
80 .. Proposed Government Fisheries Corporation May Lead to Fisheries Expansion
Colombia:
81 .. Fisheries Trends and Potential
Cuba:
82 .. Catch and Fishing Fleet Expanded
Denmark:
83 .. New Fisheries Attache Appointed for U. S. and Canada
France:
83 .. Shipyards Receive Orders from Soviets for Fishery Factoryships and from South Korea for Trawlers
German Federal Republic:
83 .. New Fish-Gutting Machine Offered by Firm
Ghana:
84 .. Technical Fisheries Assistance by Soviets
Greece:
84 .. Atlantic Freezer-Trawler Fishery Trends, January-June 1964
Greenland:
84 .. 12-Mile Fishing Limits Modified to Continue Certain Historic Fishing Rights of Other Countries
85 .. Halibut Fishery Trends, 1963
85 .. Shrimp Fishery Trends, 1963-1964
87 .. Ocean Catfish Fishery, 1963
Iceland:
87 .. Exports of Fishery Products, January-June 1964

Page

FOREIGN (Contd.):
Iceland (Contd.):
87 .. Fishery Landings by Principal Species, January-April 1964
88 .. Utilization of Fishery Products, January-April 1964
88 .. Lobster Products Exports Increased
88 .. New Type Lobster Product Available
88 .. First Fish Sausages Produced
Ireland:
88 .. Fish Meal Factory Planned for East Coast
Japan:
89 .. Albacore and Yellowfin Export Prices
89 .. Frozen Tuna Sales to U. S. Continued Slow, July-August 1964
89 .. Atlantic Tuna Fishery, August 1964
89 .. Tuna Resources in Eastern Pacific to be Surveyed by Research Vessel
90 .. Study of Resource Management Problems Confronting Tuna Fishing Industry
90 .. Market Value of Tuna Fishing Licenses Continues to Fall
91 .. Driftwood Released by Tuna Vessels Recovered
91 .. Mothership Firms to Consign Sales of Pack of Alaska Pink Salmon to Land-Based Packers Association
91 .. Halibut Landings and Exports, 1958-63
91 .. Japanese Views on New Law Prohibiting Fishing in U. S. Territorial Waters by Foreign Vessels
94 .. King Crab Operations in Bristol Bay
94 .. Bering Sea Mothership-Type Bottomfish Operations
94 .. Freezership Returns with Atlantic Trawl-Caught Fish
94 .. Atlantic Trawl Fishery
95 .. Exploratory Trawling in Northwest Atlantic to be Continued
95 .. Japan to Join Northwest Atlantic Fisheries Convention
95 .. Longer Trip Doubles Bottomfish Catch for Trawlers in New Zealand Waters
95 .. Licensing of Bottomfish Operations Off New Zealand
96 .. Status of Voluntary Fishery Export Controls, FY 1964
96 .. Hokkaido Saury Canners Sign Advance Purchase Agreement with Fishermen's Association
96 .. Fish Meal Association Organized
97 .. Fisheries Agency Approves Japanese-Chilean Whale Meat Sales Agreement
97 .. Fishing Vessel Construction
97 .. Eight Factoryships to be Built for U.S.S.R.
98 .. Fisheries Agency to Build Large Research Vessel
Republic of Korea:
98 .. Freezer Vessel Launched at Netherlands Shipyard
Mexico:
98 .. Opening of Shrimp Fishing Season
98 .. New Tariff Rates for Four Categories of Fishery Products
99 .. Foreign Trade in Fishery Products, 1963
100 .. Fisheries Trends, 1963

Contents continued page IV.

CONTENT (CONTINUED)

Page

FOREIGN (Contd.):
Mexico (Contd.):
102 .. Joint Japanese-Mexican Whaling Venture in Mexico Proposed
102 .. Four Fishery Training Vessels Ordered by Government
Morocco:
102 .. Joint Moroccan-French Tuna Fishing Exploration Planned
103 .. Canned Sardine Loans Receive Renewed Partial Guarantee from Government
Norway:
103 .. Exports of Canned Fish, January-July 1964
103 .. Herring Fish Meal Quality Control Studies
Panama:
104 .. Tuna Fishing Regulations for Foreign Vessels in Panamanian Waters
Peru:
105 .. Fish Meal and Oil Industry Trends, January-July 1964 and Outlook in September 1964
Philippines:
106 .. Development of Fishing Industry Spurred by Change in Government Import Policy
Poland:
107 .. Fishing Vessel Construction Program
Senegal:
109 .. Four Tuna Vessels to be Purchased from British
South Africa Republic:
110 .. Tuna Vessel Delivers Good Catches
110 .. New Anchovy Fishery May Develop Rapidly
110 .. Production of Leading Processed Fishery Products, 1962-1963
111 .. Fisheries Catch, 1963
111 .. Domestic Consumption of Leading Processed Fishery Products, 1963
112 .. Fiberglass Vessel Successful in Pilchard Fishery

Page

FOREIGN (Contd.):
Taiwan:
112 .. Italy and Taiwan to Sign Fishery Cooperation Agreement
U.S.S.R.:
112 .. Fishery Landings in 1964 Expected to Surpass Catch Target
113 .. Fishery Developments
113 .. Ten Freezer-Transport Vessels Built in Sweden for Soviet Fishing Fleet
114 .. Construction of Factoryship for North Pacific Near Completion
United Kingdom:
114 .. Report on Fish Boxed at Sea
115 .. Salmon and Trout Farming Method Developed in Norway Attracts Interest
115 .. First Shipment of Smoked Shark Fillets Marketed
FEDERAL ACTIONS:
Civil Service Commission:
116 .. Educational Requirements for Federal Oceanographers
Department of Commerce:
Area Redevelopment Administration:
117 .. Technical Assistance Project in Alaska to Aid Earthquake-Damaged Areas
Department of the Interior:
Fish and Wildlife Service:
117 .. Revised Standards for Grades of Frozen Fish Blocks
United States Circuit Court of Appeals:
119 .. Ruling Upholds Breaded Seafood Processor's Overtime Exemption Under Fair Labor Standards Act
120 .. Eighty-Eighth Congress (Second Session)
RECENT FISHERY PUBLICATIONS:
124 .. Fish and Wildlife Service Publications
126 .. Miscellaneous Publications

Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

Compositors: Alma Greene, Donna K. Wallace, and Marjorie McGlone

* * * * *

Photograph Credits: Page by page, the following list gives the source or photographer for each photograph in this issue. Photographs on pages not mentioned were obtained from the Service's file and the photographers are unknown.

Cover and pp. 49 & 50 (fig. 4)--William M. Stephens, The Marine Laboratory, University of Miami; p. 16 (figs. 2 & 3)--U. S. Coast Guard; pp. 38 & 39--F. B. Sanford and C. F. Lee; p. 42--Exp. Fish & Gear Research Base, State Fish Pier, Gloucester, Mass.; p. 48--Don Heuer, The Marine Laboratory, University of Miami; pp. 61 & 62--Blount Marine Corp., Warren, R. I.; p. 74--Industrias Pesqueras Atlantico, Sur S.A.I.C., Buenos Aires, Argentina; pp. 77 & 78--Australian News & Information Bureau; p. 80--E. Estlander, FAO; p. 81--Robert O. Smith; pp. 83 & 84--Nordischer Maschinenban, Rud. Baader, Lubeck, Germany; p. 89 (right)--Arnie J. Suomela; p. 94--Consulate General of Japan, N.Y.; pp. 100-102--R. S. Croker; p. 106--M. Lindner; p. 111--A. C. Jensen, Woods Hole, Mass.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price 60 cents (single copy). Subscription Price: $6.50 a year; $2 additional for foreign mailing.

COMMERCIAL FISHERIES REVIEW

November 1964 Washington, D.C. Vol. 26, No. 11

PRELIMINARY REPORT ON EXPERIMENTAL SMOKING OF CHUB (LEUCICHTHYS SP.)

By Max Patashnik*, Charles F. Lee**,
Harry L. Seagran***, and F. Bruce Sanford****

ABSTRACT

Owing to the recent problem created by bacterial contamination, the smoked fish industry of the Great Lakes faces the task of producing a marketable product under modified processing conditions. This article reports on the results obtained when chub was experimentally smoked under the processing requirements of the various State and Federal regulatory groups concerned. The results show that for industry to conform with those requirements, substantial changes will be necessary in its traditional processing methods.

INTRODUCTION

The smoked fish industry of the states surrounding the Great Lakes is of considerable local importance. Production of chub for smoking in 1962 and 1963, for example, was about 10 to 11 million pounds a year. In late 1963, however, bacterial contamination of smoked chub and whitefish resulted in the overnight collapse of that industry owing to the reactions of consumers and of regulatory groups.

The U. S. Food and Drug Administration, with the follow-up of several State regulatory agencies, published advisories specifying processing and storage conditions under which the industry would be permitted to resume production and distribution of smoked fish from the Great Lakes. Those advisories have raised the immediate question as to whether smoked chub processed and stored as specified by the various regulatory agencies would be an acceptable product. A preliminary investigation by a Bureau team of researchers showed that the industry lacked the answer to this question and that there was little if any reliable data on current processing techniques.

To assist the industry toward an ultimate solution of the botulism problem, the Bureau set up two main lines of research--one dealing with the microbiological aspects of the problem; the other with the technological aspects of processing. The microbiological work, which is being carried out under contract, will be reported separately. The present article is restricted to reporting on our preliminary investigation of processing. In presenting these results, the Bureau recognizes that the interim processing regulations of the various regulatory groups and herein evaluated are definitely preliminary. We must await results from the longer-range microbiological studies before a final regulatory code can be evolved.

The general objectives of the present investigation (January 20-February 20, 1964) were limited to the evaluation of process variables associated with the interim minimum requirements for the heat processing of smoked chub (180° F. for 30 minutes) as set forth by the

*Chemical Engineer, Technological Laboratory, Seattle, Wash.
**Chemical Engineer, Technological Laboratory, College Park, Md.
***Laboratory Director, Technological Laboratory, Ann Arbor, Mich.
****Chemist-in-Charge, Branch of Reports, Seattle, Wash.

U. S. Bureau of Commercial Fisheries

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 712

Food and Drug Administration and as interpreted by the various State agencies. The three main objectives in the work being reported here were therefore:

I. To evaluate the heat process (180° F. for 30 minutes) specified in the interim regulations and to supply the technical information necessary to achieve that process.

II. To determine whether smoked chub heat processed as specified would be an acceptable product.

III. To evaluate some of the processing variables and raw-material variables in conjunction with the process specified by the new regulation.

EVALUATION OF INTERIM REGULATION HEAT PROCESS

In general, the smoking and processing practice of the industry is still an art, rather than a technologically controlled process. Most processors lack both the devices necessary to measure internal fish temperatures during smoking and the equipment necessary to control the smoking operation. Accordingly, data were needed for evaluating the feasibility of the process specified by the new regulation.

As the study of experimental smoking progressed, it became apparent that the industry needed information on the following:

1. Smokehouse heat-input requirements.
2. Measurement of internal temperature of chub.
3. Temperature differential between internal fish temperature and smokehouse temperature.
4. Total process time.
5. Smokehouse-temperature uniformity.

SMOKEHOUSE HEAT-INPUT REQUIREMENTS: Smokehouse heat-input requirements were studied to determine the additional input of heat needed to raise the internal fish temperature to the regulation process temperature of 180° F. in a reasonable time (say, 2 to 3 hours).

General Processing Procedure: In all the studies reported in this article, we employed essentially the same equipment, raw materials, and methods. The smokehouse used was a relatively simple, electrically heated smoker designed to smoke meat products in small

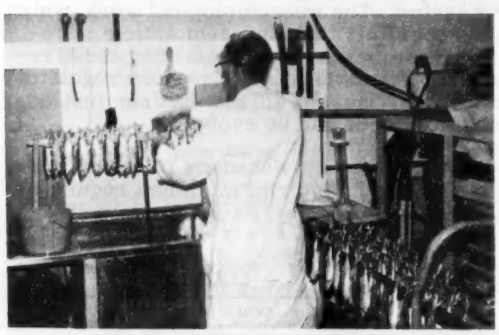


Fig. 1 - Hanging brined chub onto sticks.

Fig. 2 - Loading smokehouse.

plants. Owing, however, to the high B. t. u. heating demand for smoking of fish to 180° F. (because of short-time process with high-moisture-evaporative load), it was necessary to quadruple the heat input by the addition of a gas burner. To obtain more uniform distribution of heat and smoke, we added baffling within the smoking cabinet, a blower to obtain forced circulation inside the smokehouses, and a second blower to feed the maximum amount of smoke from an external smoke generator into the smokehouse. A multipoint recording potentiometer permitted continuous recording of temperatures. At least 10 thermocouples were employed during each run, generally 4 in the smokehouse and 6 or more embedded in the fish. The material consisted of frozen eviscerated chub. In most instances, the chub were thawed and prepared for brining and smoking in accordance with industry practice, and smoking and heat processing were carried on simultaneously. The control of humidity was not practical at the experimental temperatures used. (Note: |Most of the industry smokehouses do not now employ humidity control.)

Product load and heat input were the variables in these preliminary experiments.

Findings: A large heat input far exceeding that generally available in Great Lakes commerical smokehouses is required to bring the internal fish temperature to 180° F. in 2-3 hours. A comparison of figures 3 and 4 shows the effect of increasing the heat input by 4 to 5 times for a fixed product load. The rapid heating shown in figure 2 was necessary to ensure an acceptable yield and to avoid overdrying the product.

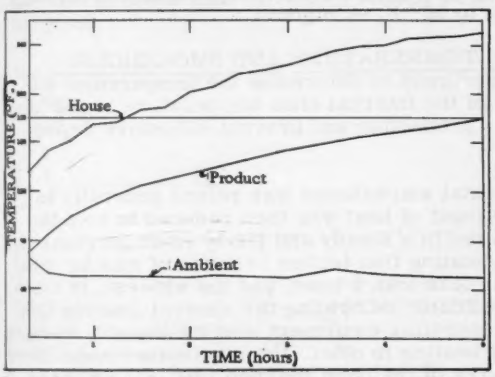


Fig. 3 - Increase of internal product temperature during smoking of chub. (Heat input: 350 B.t.u./cu. ft. hr.; product load: 50 lbs.)

In determining heating requirements, the processor must also take into account the product load. In figure 5, where the product load is approximately four times that in figure 4, the process is significantly lengthened.

TEMPERATURE MEASUREMENT: Temperature measurement was studied to determine the most reliable method for measuring the internal temperatures of chub during smoking.

Procedure: Initially, we measured internal fish temperatures by a thermocouple

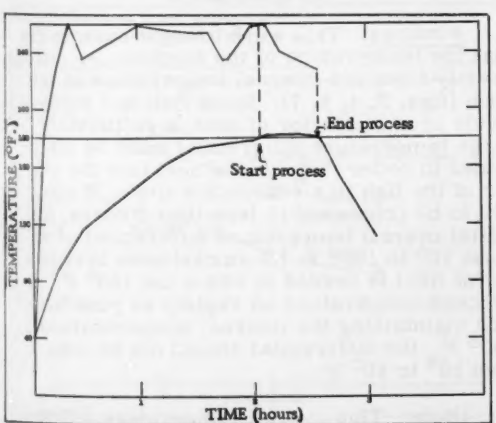


Fig. 4 - Increase of internal product temperature during smoking of chub. (Heat input: 1,600 B.t.u./cu. ft. hr.; product load: 50 lbs.)

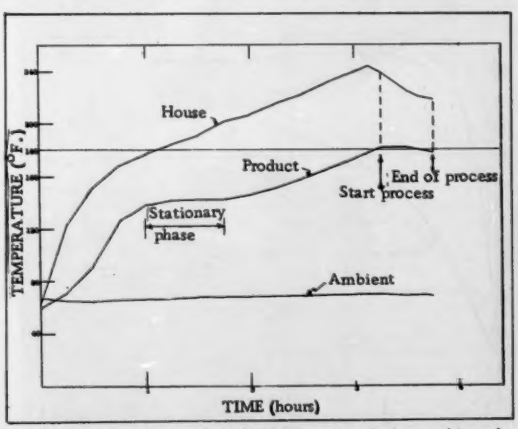


Fig. 5 - Increase of internal product temperature during smoking of chub. (Heat input: 1,300 B.t.u./cu.ft. hr.; product load: 220 lbs.)

inserted along the axial length of the fish in its thickest part (midway between its outer and inner surface). Experience demonstrated, however, that we obtained more accurate temperatures by bending the thermocouple (90 degrees) about one-half inch from its end (depending on the size of the fish), and inserting the thermocouple wire at right angles to the chub surface near the dorsal fin in the thickest part of the fish, securing the thermocouple wire to the fish by wrapping a few turns of string or preferably thin wire around both the fish and the thermocouple wire.

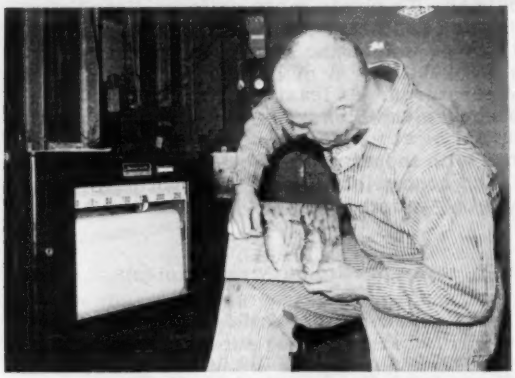


Fig. 6 - Securing thermocouple wire to chub.

Findings: Special "point-sensitive" temperature-measuring devices properly secured are necessary to give true internal fish temperatures, especially for small fish such as chub. The use of large temperature-sensitive bulbs give readings that differ markedly from the true internal fish temperatures (possibly up to 50° F. or higher).

DIFFERENTIAL BETWEEN INTERNAL FISH TEMPERATURE AND SMOKEHOUSE TEMPERATURE: We conducted the following experiment to determine the temperature differential needed to obtain a rapid continuous rise of the internal chub temperature to 180° F. Rapid temperature rise is important both to speed production and prevent excessive drying of the product.

Procedure: The temperature in the experimental smokehouse was raised generally to 240° to 250° F. in about 15 to 30 minutes, and the input of heat was then reduced to hold the temperature within that range. This method resulted in a steady and fairly rapid increase in the internal temperature of the fish. The fastest-heating fish (either because of size or location in the smokehouse) usually reached 180° F. in less than 1 hour, and the slowest, in about $1\frac{3}{4}$ hours, making the total run about $2\frac{1}{4}$ hours (predicated on holding the slowest-heating fish at 180° F. for 30 minutes). Because the smoke-generating equipment was inadequate, smoking usually was continued through the entire period of heating to obtain the maximum smoke flavor and desirable color. When the internal temperatures of the chub reached 180° F., smokehouse temperatures were slowly lowered to determine at what temperature differential the internal temperature of the fish begins to fall.

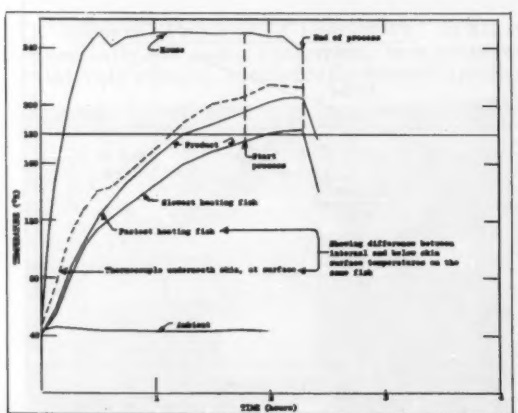


Fig. 7 - Increase in internal product temperature during smoking of chub. (Heat input: 1,600 B.t.u./cu.ft.hr.; product load: 40 lbs.)

Findings: This work brought out clearly that the temperature of the smokehouse differs greatly from the internal temperature of the chub (figs. 3, 4, 5, 7). Since fish is a relatively poor conductor of heat, a sufficiently large temperature differential must be maintained in order to drive the heat into the center of the fish in a reasonable time. If chub are to be processed in less than 3 hours, an initial overall temperature differential of at least 70° to 100° F. (of smokehouse over center of fish) is needed to attain the 180° F. process temperature as rapidly as possible. For maintaining the internal temperature of 180° F., the differential should not be less than 50° to 60° F.

(Note: This overall temperature differential, however, gives only part of the picture. Figure 7, for example, presents the spread

in internal temperatures between the fastest- and slowest-heating chub for a given run, as well as the temperatures underneath the skin for the fastest heating chub. Here the difference between the temperature at the center of the fish and the temperature underneath the skin represents the actual temperature differential driving heat toward the center. This temperature differential within the fish is substantially smaller than that between the smokehouse and the center of the fish, as is shown in figure 7. The temperature underneath the skin, in addition to being dependent on the smokehouse temperature, is also a function of the evaporation rate of moisture from the surface of the fish and therefore may vary greatly depending on such factors as air velocity and the moisture content of the air. Since this additional aspect complicates the picture, we have for simplification, considered the overall temperature differential--of smokehouse over fish--in our discussions, rather than the more variable and more difficult-to-measure temperature differential within the fish. Thus, each commercial processor employing steam or water-vapor injection and forced-air circulation should check the minimum temperature differential necessary to efficiently attain the regulation temperature of 180° F. for his specific installation.)

TOTAL PROCESS TIME: In the experiment on total process time, we studied the rate of loss of moisture and its effect on yield during a regulation process and also the effect on yield of air drying before and after processing. From the standpoint of cost and production, the total process time obviously should be as short as possible consistent with good quality and yield.

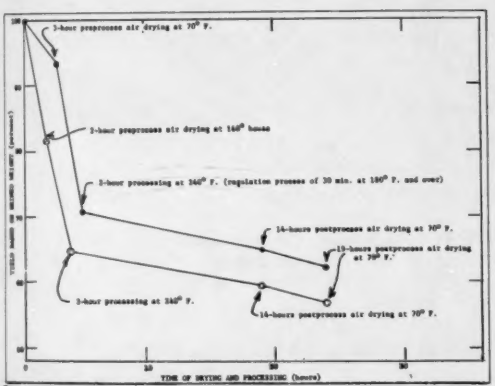

3-hour preprocess air drying at 70° F.
3-hour preprocess air drying at 140° house
3-hour processing at 140° F. (regulation process of 30 min. at 180° F. and over)
14-hours postprocess air drying at 70° F.
13-hours postprocess air drying at 70° F.
3-hour processing at 140° F.
14-hours postprocess air drying at 70° F.
TIME OF DRYING AND PROCESSING (hours)

Fig. 8 - Decrease in percentage yield during processing and pre- and post process drying of chub.

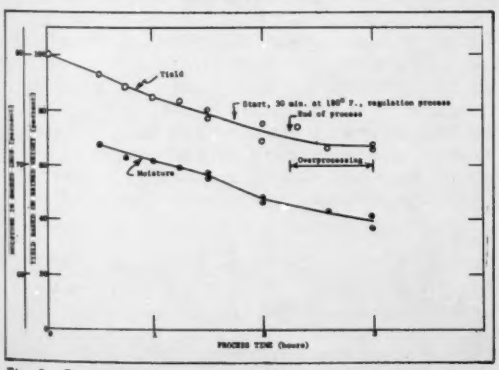


Fig. 9 - Decrease of percentage yield and moisture during regulation process and overprocessing of chub.

Procedure: The same processing procedure described under sections "Smokehouse Heat-Input Requirements" and "Differential Between Fish Temperature and Smokehouse Temperature" was followed. This general procedure was combined with pre- and post-process drying of chub.

Findings: Slow, prolonged processing as a result of inadequate heat input significantly

Fig. 10 - Weighing chub for yield studies.

reduced yield and undesirably dried the product. Predrying at low temperatures reduced final yield without accomplishing any useful purpose. For the required process temperature of 180° F., the optimum processing procedure would appear to be rapid heating with simultaneous smoking instead of smoking separately as has been industry practice in past low-temperature smoking operations. For highest yield, the total time that the chub is exposed to heat should be kept at a minimum. Figure 8 demonstrates that the loss of moisture takes place continuously before, during, and after processing. To avoid loss in yield, the operator should package the smoked product immediately after it has been chilled to storage temperature. Holding the chilled fish overnight before packaging may result in a 5- to 6-percent loss in yield. Figure 9 shows that the rates of loss in moisture and yield are fairly uniform throughout the regulation process.

SMOKEHOUSE-TEMPERATURE UNIFORMITY: Adequate forced-air circulation and good baffling in the smokehouse are essential in order to avoid undesirable hot and cold spots. Even-heat distribution is of concern to management from the standpoint both of processing regulations and of product uniformity and yield.

Grading for size in order to provide a uniformly processed product accordingly merits consideration.

PRODUCT ACCEPTABILITY

In ascertaining the acceptability of the product, we were principally concerned about the effect of the current regulation thermal-process requirements in relation to the following three variables:

1. Heat processing and smoking before packaging.
2. Heat processing after smoking and packaging.
3. Simultaneous smoking and heat processing after packaging.

HEAT PROCESSING AND SMOKING BEFORE PACKAGING: Since all states in the Great Lakes area interpreted the requirement of 180° F. for 30 minutes to apply to heating and smoking chub before rather than after packaging, the next experiment evaluated smoked chub processed according to those regulations.

Procedure: The same general procedure previously described was employed.

Findings: Processing chub at 180° F. for 30 minutes before packaging is feasible (on the basis of resultant yield and quality), although this temperature probably cannot be attained at the center of the fish with the equipment currently used in industry. Chub processed for an hour at center-of-fish temperatures of 180° to 200° F. were not excessively dry or overcooked. Processing mixed sizes of fish may present a problem, however, for the smaller fish will be overprocessed and the yield thus reduced. The decrease of yield caused by loss of moisture during regulation processing and overprocessing of chub is shown in figure 9.

Fig. 11 - Quality evaluation of chub after smoking.

HEAT PROCESSING AFTER SMOKING AND PACKAGING: To date the decision as to whether regulation heat processing (180° F. for 30 minutes) is to be carried out before or after smoking and packaging the product has not been agreed upon by all regulating agencies. Since our earlier experiment dealt with

the effect on quality of heat processing before packaging, the next experiment determined the effect on quality of regulation heat processing after packaging. We investigated the effect on quality of processing at higher temperatures--204° F., which presumably is adequate to destroy Clostridium botulinum Type E within about 10 minutes (a short-time-high-temperature pasteurization process, slightly more effective than the 180° F. for 30-minute process); and 245° F., which is adequate to destroy Types E, A, and B within about the same time (a sterilization process).

Procedure: Two separate sets of smoked samples in flexible film (vacuum) and in aluminum foil were rapidly steam-retorted at retort temperatures of about 250° to 255° F., which were reduced as necessary to hold internal fish temperatures at about 204° F. or 245° F. for the time intervals required to achieve either the estimated partial or complete sterilization.

Findings: Sterilization after smoking adversely affected the smoked flavor, producing an inferior product. In partially steam-sterilizing individual smoked chub inside the package (in aluminum foil, and in flexible film with vacuum) for about 10 minutes at an internal temperature of 204° F. (F_o = .02,[1/] which is estimated to be adequate to destroy Clostridium botulinum Type E), we found not only that the texture and smoked flavor changed significantly, though not seriously, but that any rancidity initially present in the frozen chub stock was accentuated. When individual smoked chub were fully steam-sterilized inside the package for 11 to 12 minutes at about 245° F. internal temperature (F_o = 6 plus, adequate to destroy Types E, A, and B Clostridia), the texture and smoked flavor were seriously affected.

SIMULTANEOUS SMOKING AND HEAT PROCESSING AFTER PACKAGING: We simultaneously conducted both the smoking and heating process after the product had been packaged. Potentially, this type of processing--if practical--could eliminate the hazard of bacterial contamination of the product during the period between smoking and packaging.

Procedure: In a cooperative processing experiment with industry, one group of chub, each enclosed in cellulose casings, was heat processed and smoked simultaneously. (The cellulose casing permitted the vapor phase of the smoke to penetrate the material and impart color, flavor, and odor to the product during heat processing. This technique thus theoretically permitted the product to be smoked while in the package.) A second group of unpackaged chub similarly treated acted as controls.

Findings: Only where the cellulose casing was in immediate contact with the fish did smoke, flavor, and color penetrate well. Upon removal, the casing tended to stick to the skin of the fish. Moisture collected in pockets formed by the casing, although fluid could be decreased during processing by making a small opening at the bottom of the casing. Comparisons between control and cellulose encased fish indicated that the latter retained more moisture and salt.

This method could possibly be an answer to processing smoked fish at 180° F. for 30 minutes and protecting the product from bacterial recontamination after smoking provided that the quality and higher cost problems can be resolved.

EVALUATION OF PROCESSING VARIABLES

Several process variables subject to control by the processor were evaluated for their effect on yield, quality, and composition of smoked chub, all within the framework of the regulation process (180° F. for 30 minutes). These included:

1. Raw material.
2. Brining.
3. Acid treatment.

1/ F_o serves as a commercial standard whereby the sterilizing effect of different processes may be compared under standardized conditions.

RAW MATERIAL: We studied the effect of variability in initial quality, size, and composition of the chub on the ultimate quality and yield of the smoked product prepared in accordance with the regulation process.

Procedure: Three lots of chub of significantly different initial freshness were regulation smoked. The first lot consisted of eviscerated chubs, mostly No. 2 or medium, bulk-frozen in 50-pound blocks with an ice glaze. This lot was to have been typical of commercial frozen stock. Its quality, however, was highly variable, and much of it was very poor. The second lot, which was frozen unglazed in plastic bags holding about 40 pounds, again consisted of eviscerated chubs taken by a commercial vessel. These fish were more uniform in size and of somewhat better quality. The third lot was caught by a U. S. Bureau of Commercial Fisheries exploratory vessel and frozen in plastic bags in 5-pound lots. Some bags held mostly large fish (three to the pound), and others held small; all were superior in quality to the other two lots. The general processing was similar to that used in earlier experiments.

Samples of the raw fish before and after brining and of fish after smoking, were analyzed for moisture, oil, and salt (chlorides).

Findings: The raw and the smoked chub varied widely in both composition and quality. Even fish of uniform size varied in composition, but the large fish usually had relatively more oil. In general, size, quality, and the composition of the fish all affected the absorption of salt and the other changes in the product that occurred during smoking.

The oil content of the smoked chub depended not only upon fish size (large fish were 2 to 3 percent higher in oil) but also on the extent of their drying during smoking. The percentage increase in oil content caused by drying was partly counteracted, however, by loss of oil by drip. The oil content of all samples was usually in the range of 7 to 15 percent. Moisture content depended to some degree on the extent of brining, but mainly on the drying caused by the thermal process and by the preprocess and postprocess handling. As expected, larger fish gave higher yields than smaller fish. This fact again emphasizes the importance of close grading for size before smoking.

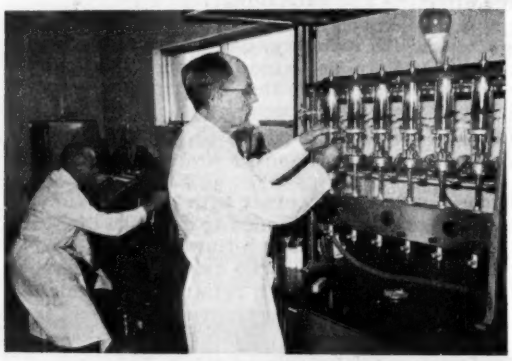


Fig. 12 - Oil-extraction apparatus.

When the heat input was sufficient to enable the processing to be completed within 2½ hours, the yield of smoked product was 68 to 73 percent of the brined weight. Slow heating, overprocessing, or air drying, either before or after smoking, reduced the yield to about 55 to 65 percent.

Chub of initially poor quality or those that subsequently became poor in quality while in frozen storage gave a less desirable smoked product and lower yields. Oxidative rancidity was clearly apparent immediately after smoking in the more poorly preserved frozen chub.

BRINING: We studied the effect of various brining conditions on the ultimate quality and yield of the smoked product in relation to the regulation process.

Procedure: Some lots of chub were brined overnight in 20° to 30° salinometer brine in accordance with industry practice. Other lots were placed in stronger brines (50° and 70° salinometer) for 1 or 2 hours. Another lot, involving 11 sublots, was brined in concentrations ranging from 0 to 100° salinometer (saturated). All lots were given the regulation process.

Findings: On the basis of taste-panel tests, 2 to 3 percent salt in the smoked product appeared to be the acceptable range for most consumers. Smoked products in this salt range

Fig. 13 - Taste-panel evaluation of chub for salt level and quality.

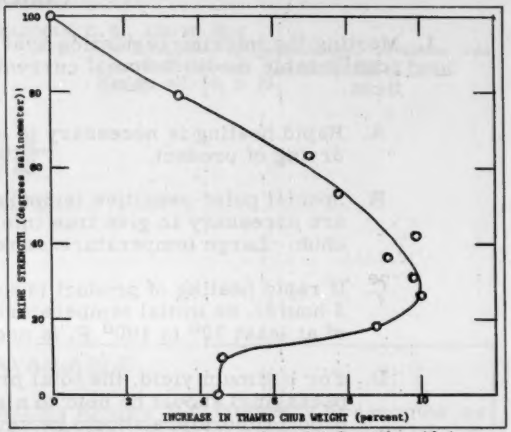


Fig. 14 - Percentage change in thawed chub weight with increasing strength of brining solution (18-hour brining time).

required a salt content of about 1 to 2 percent before being smoked. Brining chub overnight (16 to 18 hours) in 20° to 25° salinometer brine or for 2 hours in 40° to 50° salinometer brine usually resulted in a satisfactory level of salt in the smoked product.

In the test using 11 brine concentrations, the fish gained weight in all lots but the one involving saturated brine. As expected, the uptake of salt during brining depended largely on the concentration of brine and duration of brining. The maximum increase of 10 percent in chub weight occurred in brines of 25° and 30° salinometer (fig. 7). Figure 15 shows the percentage increase of salt content in brined and smoked chub with increasing strength of brining solution.

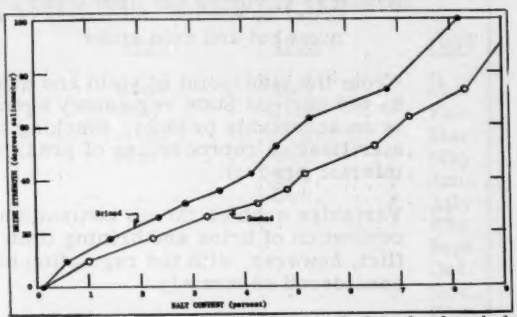


Fig. 15 - Increase in salt concentration in the brined and smoked product with increasing strength of brining solution (18-hour brining time).

ACID TREATMENT: We studied the feasibility of increasing the acidity of the meat of smoked fish to a pH at least 4.0 by an acid pretreatment as a means of inhibiting Clostridium botulinum growth (Type E toxin has been demonstrated, however, in pickled herring of pH 4.0 to 4.2 at 23° C., Dolman, Chang, Kerr, and Shearer, 1950; and Dolman and Iida, 1963.) We recognized that the buffered nature of the fish tissues would present difficulty in lowering the pH of the product. To answer several requests from industry for such data, however, and to estimate the resulting effect on the quality of the product, we carried out experiments with several acids that are sometimes used in food products.

Procedure: The following acid-brine treatments were tried: 10-percent acetic acid for 1 hour, 5-percent acetic acid for 18 hours, 2-percent phosphoric acid for 2 hours, 5-percent lactic acid for 16 hours, and 2-percent lactic acid for 16 hours. Controls were run with each set of acid-treated fish.

Findings: When the acidity of the smoked fish product was increased significantly by employing acetic, phosphoric, or lactic acids during the brining operation, the quality was impaired. Texture and flavor acceptability decreased markedly as did also the yield. Increasing the acidity by decreasing the pH of the smoked product to 4.0 or lower therefore appears to be impractical.

CONCLUSIONS

I. Meeting the interim-regulation heat process (180° F. for 30 minutes) will require considerable modification of current commercial processing equipment and practices.

   A. Rapid heating is necessary to ensure good yield and to avoid excessive drying of product.

   B. Special point-sensitive temperature measuring devices (thermocouples) are necessary to give true internal temperatures for small fish such as chub. Large temperature-sensitive bulbs give false readings.

   C. If rapid heating of product is to be achieved (process time of less than 3 hours), an initial temperature differential (of smokehouse over fish) of at least 70° to 100° F. is needed.

   D. For optimum yield, the total process time (from presmoking through packaging) should be held to a minimum consistent with quality. The product therefore should be smoked, cooled, and packaged rapidly.

   E. Forced-air circulation and baffling in the smokehouse are essential in order to ensure uniformity of smokehouse temperature and thus minimize hot and cold spots.

II. From the standpoint of yield and quality, smoked chub heat processed as specified by the various State regulatory agencies (180° F. for 30 minutes outside the package) is an acceptable product. Smoking of chub after packaging, or pasteurization or sterilization reprocessing of presmoked chub after packaging, however, yields an inferior product.

III. Variables such as the oil content and size and quality of the raw fish affect the concentration of brine and brining time needed. These process variables do not conflict, however, with the regulation process as such--that is, each variable must be considered separately.

   A. Chub vary widely in size, composition, and quality. These variables all affect salt uptake during brining and product behavior during smoking.

   B. Two to 3 percent salt in the smoked product appears to be an acceptable range for most consumers.

   C. Decreasing the pH of smoked fish to 4.0 or lower appears to be impractical from the standpoint of product quality.

FUTURE CONSIDERATIONS

Although the current interim regulations adopted by State regulatory groups are feasible from the standpoint of quality and yield and probably will give greater protection to the product than before, the actual degree of microbiological safety for a product mishandled during distribution (for example, held at a storage temperature higher than recommended) is at present unknown.

We anticipate that the Bureau's microbiological contract work will shed light on this aspect of the problem. Several different ways of attacking it are being tried simultaneously. Results of the Bureau's efforts in this field will be disseminated as rapidly as each phase of the work is completed.

LITERATURE CITED

DOLMAN, C. E.; H. CHANG; D. E. KERR; AND A. R. SHEARER
1950. Fish-Borne and Type E Botulism: Two Cases Due to Home-Pickled Herring. Canada Journal of Public Health, vol. 41, pp. 215-229.

DOLMAN, C. E., AND H. IIDA
1963. Type E Botulism: Its Epidemiology, Prevention, and Specific Treatment. Canada Journal of Public Health, vol. 54, p. 29.

BACK ISSUES AVAILABLE

Copies of back issues of Commercial Fisheries Review for the years and months as indicated below are available upon request by writing to: Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Dr., Arlington, Va. 22209. Requests will be filled on a first-come first-served basis until the supply is exhausted.

1956	1957	1958	1959	1960	1962	1963
Jan.	Jan.	Jan.	Nov.	June	May	Jan.
Apr.	Apr.	Feb.	Dec.	July	June	Feb.
Dec.	Aug.	Mar.		Aug.	Aug.	Mar.
	Sept.	May		Sept.	Oct.	May
	Oct.	June			Nov.	June
	Nov.	July			Dec.	July
	Dec.	Dec.				Aug.
						Sept.
						Oct.
						Nov.
						Dec.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

AGE COMPOSITION OF THE COMMERCIAL CALIFORNIA BLUEFIN TUNA CATCH IN 1963

By Peter A. Isaacson*

ABSTRACT

Over 30 million pounds of bluefin tuna were landed at California ports in 1963, making it the third largest season in 46 years. The fishery was dependent on fish of age groups I, II, and III which comprised 89 percent by weight and 97 percent by numbers of the catch. Age group II was the largest age group by weight comprising 43 percent of the total quantity.

Good correlation was found between the means of age groups I, II, and III and length-frequency modes, strongly supporting the theory that checkmarks on scales are of annular origin.

INTRODUCTION

Between the years 1918 and 1963 the California commercial landings of bluefin tuna (Thunnus thynnus) have varied from about 0.5 million pounds in 1933 to over 31 million pounds in 1962. During the past 10 years bluefin tuna has placed among the top 10 commercial species in value and pounds landed. The past season, 30,400,087 pounds of bluefin tuna were landed at California ports, making 1963 the third largest season in 46 years.

Annual bluefin age and growth parameters are necessary before population dynamics can be investigated. Due to the constantly increasing demand for fish as a source of food and a source of certain manufacturing industries, and because of the danger that even the apparently limitless stocks of the oceans might be depleted by the continuous removal of its resources, the dynamics of the population from which our commercial fishery draws its catch must be understood before realistic management judgments are possible. To aid in determination of maximum sustainable yield of the eastern Pacific bluefin stock, data was collected from the 1963 commercial bluefin landings at Terminal Island, Calif., on both age and length frequency so that an estimation of the age composition of the catch could be made.

Table 1 - Calculated Percentage of Fish Landed Both by Number and by Weight for Age Groups 0 Through VI for the 1963 Season Year-Class Are Also Indicated

Age Group	0	I	II	III	IV	V	VI
Year-Class.	1963	1962	1961	1960	1959	1958	1957
Percentage Catch By Number. . .	0.29	47.30	40.27	10.02	1.45	0.48	0.19
Percentage Catch By Weight . . .	0.11	25.11	43.75	20.26	6.27	2.96	1.54

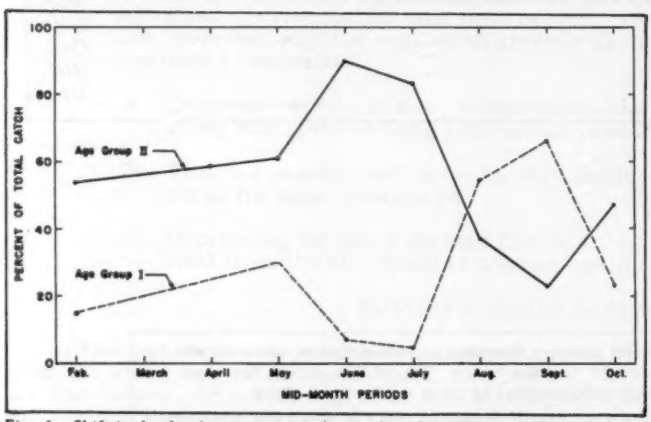


Fig. 1 - Shift in the dominant age group by numbers from age group II to age group I.

MATERIAL AND METHODS

The absolute age determination of tuna is difficult and the results obtained from some investigations are problematic. The scale technique as used by Bell on the albacore, Thunnus alalunga, (1962) and bluefin tuna (1963) was sufficiently encouraging to justify the use of his methods.

*Marine Biologist, Marine Resources Operations, Department of Fish and Game, Menlo Park, Calif.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 713

Scale samples and length-frequency data were collected throughout the 1963 season. Length-frequency samples were collected randomly and consisted of 50 fish from each vessel in port. At times, conditions arose when all vessels could not be sampled; however, a concerted effort was made to sample as many vessels as possible. The fish were measured, to the nearest centimeter, from the tip of the upper jaw to the fork of the tail. A sample of approximately 50 scales was obtained from every fifth fish in the length-frequency sample for use in age determinations. Scales were taken from either the caudal peduncle or from an area below the second dorsal fin.

Bluefin scales are difficult to read and cleaning and staining the scales helped to distinguish the checkmarks (Bell 1963). Eleven percent (132) of the 1,170 scale samples were unreadable due to oil impregnation, regeneration, or other imperfections.

RESULTS

Of the 1,038 scale samples read, only 24 were from age groups 0, IV, V, and VI. Over 89 percent of the weight of the fish caught in 1963 consisted of age groups I, II, and III, with age group II contributing 43 percent of the quantity. Over 97 percent of the catch by number consisted of the same age groups with age group I the dominant age group (table 1.)

Table 2 - Ages of 1,038 Bluefin Tuna Caught in the Commercial Fishery in the 1963 Season

Age Group	0	I	II	III	IV	V	VI
Number.	3	491	418	104	14	5	2
Mean Length (cm.)	57.7	64.3	83.5	102.9	136.0	155.0	170.5
Standard Deviation	1.53	2.55	8.68	6.47	11.13	2.92	3.54
Standard Error of Mean.	0.89	0.15	0.42	0.63	2.87	1.30	2.50
Range.	56-59	54-88	60-109	71-135	120-155	151-158	168-173

From mid-July through mid-September there was a shift in the dominant age group by numbers from age group II to age group I (fig. 1). Ninety percent of the landings of age group I were made in those two months and contributed over 60 percent of the total catch by numbers.

The good correlation found between the means of age groups I, II, and III and length-frequency modes strongly support the theory that checkmarks on scales are of annular origin. Small samples sizes for age groups 0, IV, V, and VI gave inconclusive comparisons (table 2, fig. 2).

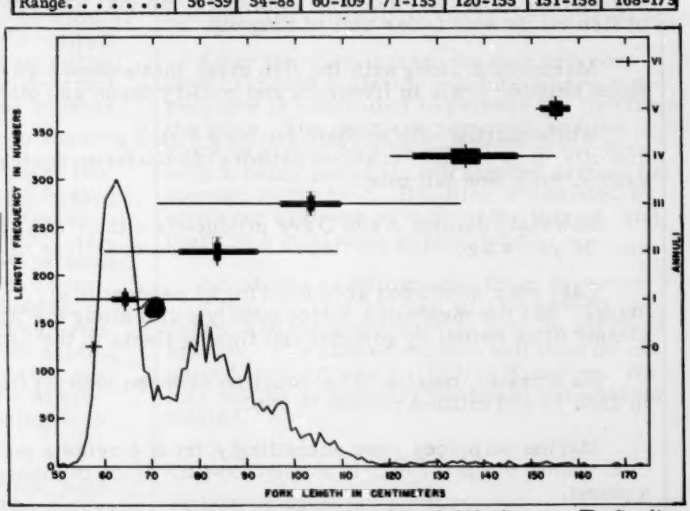


Fig. 2 - Age and length frequency relationship of sampled bluefin tuna. The fine line represents the range; the long solid box, one standard deviation on either side of the mean; and the short box, one standard error of the mean on either side of the mean.

SUMMARY

The 30.4 million pounds of bluefin tuna landed in California made 1963 the third largest season in 46 years. The fishery was dependant on fish of age groups I, II, and III which comprised 89 percent by weight and 97 percent by numbers of the catch. Age group II was the largest age group by weight comprising 43 percent of the total quantity.

A second movement of bluefin into our fishing area may be indicated by a shift in dominant year-classes by number in the later part of the fishery.

Only 11 percent of the 1,170 scale samples collected were unreadable for various reasons and the good correlation between length-frequency modes and means of age groups I, II, and III strongly indicate that checkmarks on the scale are of annular origin.

LITERATURE CITED

BELL, ROBERT R.
1962. Age Determination of the Pacific Albacore of the California Coast. California Fish and Game, vol. 48, no. 1, pp. 39-47.

1963. Preliminary Age Determination of Bluefin Tuna, Thunnus thynnus. California Fish and Game, vol. 49, no. 4, p. 307.

TODAY SMALL FISH USED TO MAKE LOW-COST MARINE OILS

If the fish aren't biting it costs the paint and varnish industry more than usual to manufacture its products.

What's the connection? It's a boney fish too oily to eat, weighing less than a pound, measuring less than a foot--the menhaden, the principal source in the United States of the marine oils used as drying agents in paints and varnishes.

Marine oils mixed with raw linseed oil are used in exterior house paints. They're used also in barn and roof paints, rust-proof coatings, and undercoat paints. In varnish, bodied fish oil is combined with tung oil, a use that will probably increase because the cost of fish oil is well under that of tung oil.

Marine oils, along with the fish meal that's produced at the same time, are used on a much smaller scale in livestock and poultry feeds and other products.

While marine oils account for less than 3 percent of the United States output of fats and oils, they are low-cost competitors of such farm-derived products as soybean, linseed, castor, tung, and tall oils.

Now that vitamins A and D are produced synthetically, another type of marine oil popular 30 years ago--the medicinal oil such as cod-liver oil--has all but vanished.

Last year menhaden accounted for 90 percent of all marine oil produced in the United States. But the menhaden, which mostly swim along the Atlantic and Gulf coasts, weren't around to be netted by commercial fishing fleets in the usual numbers last year.

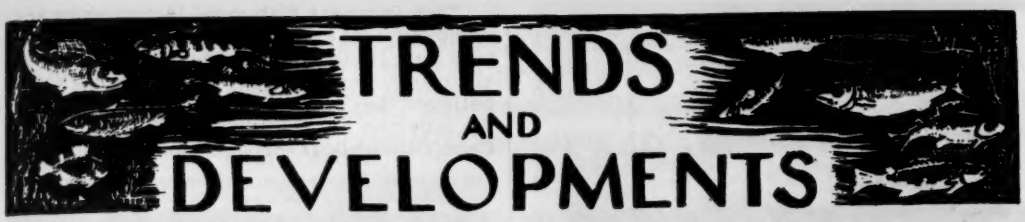
As a result, marine oil production dropped sharply from a high of 266 million pounds in 1961 to 186 million pounds in 1963.

Marine oil prices rose accordingly, from 4 cents a pound (Baltimore) in January 1963 to 8.5 cents in April 1964. In August 1964 the price of menhaden oil had risen to 8.75-9.25 a pound.

At 4 to 5 cents a pound, fish oil is one of the lowest-priced oils on world markets. While manufacturers like the quality finish the marine oils give paint and varnish, it's basically price that gives fish a competitive edge over soybean, linseed, and other drying oils, both at home and abroad.

The United States is a net exporter of marine oils, selling menhaden and buying whale sperm oil which is used as a lubricant in fine precision instruments.

This favorable export position is relatively new. Up until 1950 we were a net importer. (The Farm Index, U. S. Department of Agriculture, August 1964.)



Alaska

HANDLING AND PROCESSING ABOARD JAPANESE VESSELS OF ALASKA SALMON: Two of the Japanese vessels in Prince William Sound, which processed fresh salmon purchased from Alaska fishermen this past summer, were visited in August 1964 by an observer from the U. S. Bureau of Commercial Fisheries. He was accompanied by the representative of a Japanese international combine who was serving as coordinator for the Japanese fishing firms involved in the salmon purchase. Processing aboard the Japanese factoryships was said to be similar in all cases. The Japanese vessels visited were the stern-ramp freezer trawlers Ibuki Maru and Daishin Maru No. 15. A description of the processing aboard those vessels follows:

Normally, Japanese workmen board the fishing boat and place the fish into a brail with a purse-string closure in the center. No salmon are accepted that are badly watermarked or that have been pewed through the body. Those men handle the fish with gloved hands. When the brail is loaded, it is lifted aboard the processing vessel, and the fish are released on an elevated sorting table. Here the salmon are inspected, segregated by species, and placed in a sheet-metal chute leading to the processing deck below.

Processing aboard is very simple, with all salmon frozen in the round. The fish are thoroughly washed with soft brushes and salt-water sprays (no tanks or dips and no water used twice). Pink salmon are placed in stainless steel freezer pans with removable bottoms that hold about 10 kilograms (22 pounds). The pans hold 6 to 10 pink salmon placed in a single layer side by side, head to tail to head. A similar freezer pan somewhat larger--perhaps 15 kilos (33 pounds)--is used for larger fish.

Small chum salmon are hand-packed like the pink salmon. Larger chum salmon are placed on a sheet of plastic packaging material, sprayed with an antioxidant, and frozen individually.

After being packed, the fish are conveyed to the freezing compartment. The Japanese vessels are equipped with at least 12 hydraulically-operated pressure plate freezers each with a capacity of about 1 ton. In addition, they usually have a blast freezer to handle individual fish and other nonuniform jobs. The freezing cycle is 4 to 6 hours depending on the load and other fish waiting to be processed.

After they are frozen, the fish are conveyed through a glazing machine where temperature is controlled to release the fish from the pans. The pans are removed, and the block is glazed in a second glazing machine before being packed in corrugated cartons for storage in the hold. Handling is assisted by conveyer systems or salt-water flumes, and there is a minimum of hand labor.

According to information from Japanese sources, the pink salmon will be canned in Japan, and the chum salmon sold on the fresh market. The canned salmon will then be exported, probably to the United Kingdom. No fish cutting was observed aboard the vessels visited.

* * * * *

FOREIGN FISHING ACTIVITIES OFF ALASKA: U. S. S. R.: Soviet trawling activity in the Gulf of Alaska was gradually reduced through August 1964. By month's end about 30 trawlers accompanied by various types of support vessels were operating alternately on Albatross and Portlock Banks off Kodiak Island. Soviet activity in the Gulf during 1964 has been considerably less than in 1963. It was believed this was due to expanding saury and herring fishing activities off the Siberian

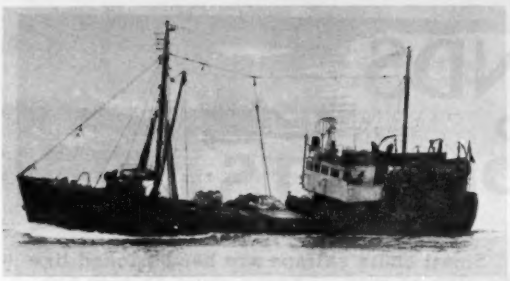


Fig. 1 - Type of Soviet trawler operating in North Pacific and Bering Sea.

coast and Sea of Okhotsk rather than to any lessening of fishing success in waters off Alaska.

Soviet whaling activity shifted into the Bering Sea during August, with one fleet operating east of the Pribilof Islands, a second fleet fishing generally south and west of that island group, and a third hunting along the Aleutian Chain. It was believed that 1964 was the first year the Soviets have commercially exploited the whale resources of the eastern Bering Sea.

Japan: Two Japanese king crab factoryships, the Tokei Maru and Tainichi Maru, accompanied by 12 catcher vessels fished along the north side of the Alaska Peninsula from the vicinity of Unimak Pass to the Port Moller area during August.

Fig. 2 - Sorting and weighing crab meat prior to freezing aboard a Japanese king crab factoryship.

One shrimp factoryship (Einin Maru) accompanied by 12 trawlers continued to fish north of the Pribilof Islands group. The second shrimp factoryship, the Chichibu Maru, was believed en route to resume fishing for shrimp in that same area after transferring the salmon purchased in Prince William Sound to the vessel Haruna Maru on the high seas.

Two Japanese fish meal factoryships accompanied by an undetermined number of trawlers returned to the eastern Bering Sea after an absence of several weeks. It was believed they later shifted operations west to the Siberian coast (between Cape Navarin and Cape Oliutorskii) through most of August.

Fig. 3 - Type of Japanese trawler operating in the Bering Sea.

It was believed that Japanese whaling operations were terminated in August and that those fleets might be en route to Japan.

Two small Japanese side trawlers and 4 stern trawlers were reported fishing for shrimp and Pacific ocean perch on Albatross Bank off Kodiak during August 1964.

* * * * *

KODIAK HAS EXCELLENT SALMON SEASON:

Kodiak Island had what appeared to be the best pink salmon year in recent history. The weekly closures on salmon fishing there this year (1964) have been primarily to give the rushed canneries an opportunity to keep pace. But a pessimistic note at Kodiak during August was the presence of large king crab vessels with no market for their catch. One shore plant was processing crabs on a part-time basis. Only two other processors were then operating--one at Port Wakefield and the other at Jap Bay.

It was believed there would be at least five king crab plants in operation in Kodiak by late fall. Another plant was operating in Raspberry Straits, just a few minutes flying time from Kodiak.

* * * * *

KODIAK PROCESSING PLANT VERY ACTIVE:

A Kodiak cold-storage and processing plant (temporarily put out of commission by

the March 27 earthquake) was reported to have bounced back stronger than ever. This past August there were about 60 people working in the Dungeness crab-processing section of the plant which was started about a year ago. The crabs being processed were large--3-5 pounds, and they were plentiful. The product is prepared in several different ways, ranging from picked meat put up in 5-pound cans to individual selected crabs which are ice-glazed and frozen whole after being dipped in a special formula of brine. Those whole crabs reach the market without being cleaned, but the bright red shells have been scrubbed to a polished sheen. In addition to Dungeness crab, a king crab-processing line has just been set up in another section of the Kodiak plant. That other section is operated by a different firm and employs about 35 people. On the main floor, salmon and halibut are cleaned and frozen during the season. Daily landings of halibut at the plant at the end of July were near 600,000 to 700,000 pounds. The cold-storage section of the plant employs about 45 persons.

* * * * *

GOOD PROGRESS IN HERRING REDUCTION:

Herring reduction plants at Big Port Walter and Washington Bay were having a good production season this past summer. At Big Port Walter the pumping system of unloading fish is being replaced this year with a "marine leg" bucket elevator, which was used a few years earlier. The reason for the reversion is to slow down unloading equipment and to decrease loss of oil. By the end of August 1964, 88,000 barrels of herring were processed at Big Port Walter, with the oil yield exceeding 5.5 gallons per barrel.

* * * * *

AMPLE SUPPLIES FOR CRAB-PROCESSING PLANTS:

As of August 1964 there were three shore-processing plants and two floating plants processing crabs in the Shumagin Islands and Alaska Peninsula areas. Crab catches in those areas were excellent and adequate to keep the plants operating on a full-time basis.

* * * * *

CORDOVA DUNGENESS CRAB PRICES DROP:

Dungeness crab fishermen in Cordova were faced with a drop in price from 14 cents to 12 cents a pound for whole crab on August 15. The price decline was attributed to market demand. The only Dungeness crab packer on the Sound also said fishermen would be placed on a limit because the plant was unable to keep up with the catch.

* * * * *

FILING OF FISHERY DISASTER LOAN APPLICATIONS EXTENDED TO OCTOBER 31, 1964:

Extension of the time for acceptance of fishery disaster loans to October 31, 1964, was announced by the Regional Director for the U. S. Bureau of Commercial Fisheries in Alaska, on September 25. The Secretary of the Interior authorized the extension of the time for acceptance of fishery loan applications to be handled as disaster loan applications from September 30, 1964, to October 31, 1964. Disaster loans through the U. S. Bureau of Commercial Fisheries provide financial assistance to fishermen who need to replace or repair commercial fishing vessels or fishing gear that was lost, damaged, or destroyed during the March 27, 1964, earthquake or subsequent tidal waves.

Note: See Commercial Fisheries Review, October 1964 p. 13.

Alaska Fisheries Explorations and Gear Development

SHRIMP EXPLORATIONS OFF ALASKA:

M/V "Paragon" Cruise 64-2 (June 16-September 19, 1964): Exploratory fishing for shrimp and other shellfish (scallops) in the Gulf of Alaska and Bering Sea was the principal objective of this 13-week cruise by the U. S. Bureau of Commercial Fisheries chartered exploratory fishing vessel Paragon.

A total of 308 stations in the area of operations was covered during this cruise. Emphasis was oriented toward completion of uniform seasonal summer shrimp explorations for the northern portion of the Gulf of Alaska from Cape St. Elias westward to the Aleutian Islands. During three summer seasons, beginning in 1962, over 500 exploratory shrimp trawl drags were completed in that area by fishing vessels chartered by the U. S. Bureau of Commercial Fisheries. Secondary objectives of the Paragon's cruise included preliminary shrimp explorations in selected areas of the eastern Bering Sea and recon-

naissance for indications of scallops in waters adjacent to Kodiak and the Alaska Peninsula.

The primary sampling gear used were 40-foot flat and semiballoon shrimp trawls and an 8-foot New England style scallop dredge.

Fig. 1 - Chartered exploratory fishing vessel Paragon.

To facilitate cruise organization and comparative evaluation, the area fished during Paragon's Cruise 64-2 was divided into 5 geographic entities--Area D, consisting of the waters off the northern end of Kodiak Island and Marmot Bay; Area E, the southern portion of Shelikof Strait and waters adjacent to the Alaska Peninsula west to Sutwik Island; Area F, west of the preceding to Unimak Island (including the Shumagin Islands); Area G, Sanak Island west to Unalaska Island including Unimak Pass; and Area H, selected portions of the Bering Sea and Bristol Bay.

The abundance of shrimp in the vicinity of the Shumagin Islands (Area F), indicated by earlier Bureau explorations in 1957, was positively substantiated during this cruise. The average catch rate for 82 thirty-minute trawl drags in that area was over 650 pounds. Individual catches of over 1,000 pounds of shrimp were common. Of particular note was the fact that those catches included significant quantities of the desirable side-stripe shrimp

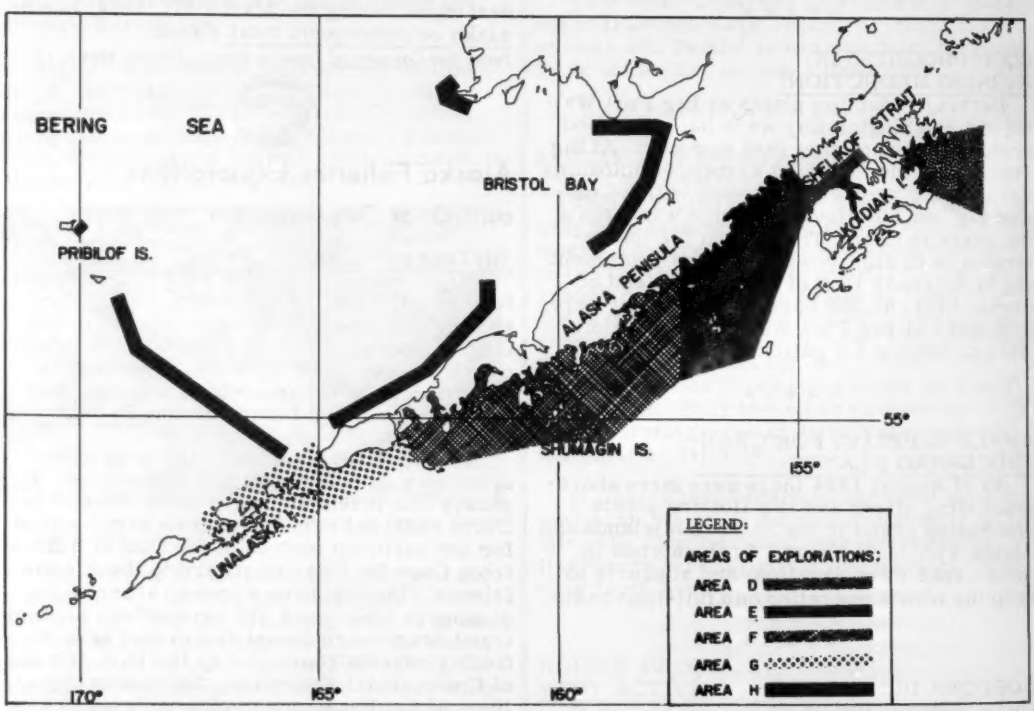


Fig. 2 - Shows division into geographic areas of Paragon Cruise 64-2, June 16-September 19, 1964.

Summary of Catch Data for Shrimp Taken on the M/V Paragon Alaska Exploratory Cruise 64-2

Shrimp Species		Average Catch of Shrimp Per Trawl Drag				
		Area (no. of shrimp trawl drags taking shrimp)				
Common Name	Scientific Name	D(29)	E(14)	F(82)	G(48)	H(59)
		(Lbs.)				
Pink shrimp	Pandalus borealis	58.4	20.0	479.7	75.8	5.3
Side-stripe	Pandalopsis dispar	121.3	37.3	119.6	17.8	0.4
Humpy	Pandalus goniurus	.2	-	35.1	-	-
Coon-stripe	Pandalus hypsinotus	.9	.4	18.9	1.4	-
Total		180.8	57.7	653.3	95.0	5.7

(Pandalopsis dispar) which averaged in size about 26 whole shrimp to the pound. This species was also well represented in Marmot Bay (Area D).

In the overall survey, pink shrimp (Pandalus borealis) was the dominant species, accounting for almost 70 percent of the total shrimp taken. Other species caught, but in relatively small quantities, included "humpy" (Pandalus goniurus) and coon-stripe (Pandalus hypsinotus).

Reconnaissance for scallops was carried out at locations where local knowledge of scallop (Patinopecten caurinus) occurrence had been indicated. Sixty-seven sampling drags were made with an 8-foot wide scallop dredge. From that total, 28 of the drags caught scallops in quantities ranging from 1 to 250 per 30-minute drag. The best catch was from near Marmot Island and consisted of about 250 six-inch scallops. Only six drags took more than one bushel of scallops. The results of those limited scallop explorations do not provide evidence of commercial concentrations in the areas sampled.

In addition to data on shrimp and scallop abundance, records were kept throughout the cruise of other shellfish and fish caught. For example, data such as the size and number of halibut (Hippoglossus stenolepis) taken during trawl drags were recorded. One 30-minute shrimp trawl drag made in inner Bristol Bay yielded 252 juvenile halibut which indicates that location is included in an important nursery area.

Note: See Commercial Fisheries Review, August 1964 p. 14.

Alaska Fishery Investigations

COPPER RIVER SOCKEYE SALMON SEROLOGICAL SAMPLING:

The Branch of River Basin Studies, U. S. Bureau of Sport Fisheries and Wildlife, in Western Alaska has completed its 1964 collection of Copper River sockeye salmon blood samples for serological analysis at the Seattle Biological Laboratory. Samples were taken from 406 fish in the commercial fishery at the Copper River Delta and from 991 fish on the spawning ground of the upper and lower Copper River.

An attempt was to be made this year (1964), on the basis of serological analysis, to separate fish in the commercial fishery into races that have been already identified on the spawning grounds.

* * * * *

NAKNEK SYSTEM RED SALMON SMOLT OUTMIGRATION:

An estimated 7.2 million red salmon smolt were reported to have left the Naknek Lake system in 1964. Thus, the 1964 outmigration was considerably smaller than the peak outmigration of 16.8 million estimated in 1962.

About 69 percent of the 1964 migrants were 3-year-olds from the 1961 brood year, while the remainder of the smolts were 2-year-olds from the 1962 brood year. From 1956 to 1961, 2-year-old smolt made up the largest part of the yearly outmigrations. However, since 1962, the outmigrants have mainly been 3-year-olds, with the 1964 smolt run having the greatest percentage of 3-year-olds on record.

* * * * *

KARLUK LAKE SALMON ESCAPEMENT:

Adult escapement of sockeye salmon to Karluk Lake through August 20, 1964, numbered 225,512 fish or somewhat below the

1961-63 average of 264,000 by that date. Also, 219 king salmon and 28,275 pink salmon had passed the weir up to that date. A substantial pink salmon run appeared to be developing at that time.

* * * * *

CRAB TAGGING PROGRAM:

Although bad weather hampered vessel operations during late August, more than 4,000 crabs were tagged. Tagged crabs were released in offshore areas on Albatross Bank, near Chirikof Islanu, and west of Chirikof Gully near the Semidi Islands. Returns from those releases should give important information on the geographical boundaries of several stocks of crabs.

* * * * *

OLSEN BAY PINK SALMON RUN, 1964:

The early pink salmon run this past season, which was smaller than in recent years, entered Olsen Creek by August 10, and the late run was beginning to enter the stream by August 20. Chum spawning (totaling about 5,000 fish) was virtually completed by the end of August.

Prior to the Alaska earthquake this past March, 95 percent of chum spawning and 75 percent of pink spawning occurred in the Olsen Creek intertidal zone. This year only 25 percent of the chums utilized the intertidal area, and through August only 35 percent of the pinks. Chums spawned this year in the new intertidal zone between present tidal elevations of 7.5 and 10.5 feet. That elevated area corresponds with the pre-earthquake lower intertidal zone (elevation 2.5 to 5.5 feet), and was never before occupied by chum salmon. Pink salmon are also spawning in the 7.5- to 10.5-foot section; they have used that area before (when it was 2.5 to 5.5 feet), but only in years when spawners were much more abundant than this year.

Mortality of eggs deposited in the pre-earthquake 2.5- to 5.5-foot zone was nearly 100 percent in former years. That high mortality was probably due to a high percentage of fine material in the streambed, and to extreme changes of temperature, salinity, and dissolved oxygen accompanying tidal cycles.

Because of elevation of the spawning area by the earthquake, the lethal effects of tide on the pre-earthquake 2.5- to 5.5-foot zone have now largely been eliminated. The principal remaining limiting factor is excessive fine materials in the streambed gravels. Therefore, survival of eggs in the present 7.5- to 10.5-foot level will depend mainly on how rapidly salmon spawning and stream action will remove the fine materials to permit adequate intragravel water circulation. Assessment of survival in the fall of 1964 and again next spring by egg pumping will give the answers.

* * * * *

TRANSPLANTING LIVE PINK SALMON:

At Kuiv Island this past August, from 3,000 to 4,000 live pink salmon were seined and placed in circulating sea water tanks aboard a fishing firm's tender. The fish were caught in Bear Harbor, Affleck Canal, and arrived at Little Port Walter in good condition after a 7-hour trip. They were released into a large floating pen in the bay and held for later release in Sashin Creek above the weir. Mortality during capture and transit was less than 5 percent. Observations of the distribution of the transplanted fish in Sashin Creek were to be made, and survival of their progeny will be measured in order to study this method as a transplanting tool.

* * * * *

STUDIES ON MIGRATIONS OF JUVENILE SALMON:

The M/V Heron accompanied by the reconnaissance-catcher vessel Blue Boat completed Early Sea Life of Salmon cruises 3 (July 27-August 5) and 4 (August 17-24) in major channels of Southeastern Alaska and on the outer coasts of Chichagof and Prince of Wales Islands. Those cruises were part of a series to trace seaward migrations of juvenile salmon as they move through summer nursery areas to the Gulf of Alaska. The cruises were highly successful because ideal weather conditions prevailed for observations and fishing. Round haul seine catches from the Blue Boat ranged from several hundred to several thousand per set.

American Fisheries Advisory Committee

FISHERIES PROBLEMS TO BE DISCUSSED AT 18TH ANNUAL MEETING:

Testing and tasting of irradiated fishery products was to be one of the highlights of the 18th annual meeting of the American Fisheries Advisory Committee scheduled to be held at Beverly, Mass., October 5-7, 1964, announced the Regional Director, North Atlantic Region, U. S. Bureau of Commercial Fisheries, on October 1.

During its 18th meeting, the Advisory Committee will review national and international problems confronting the United States commercial fishing industry and also review research and other programs of the Department of the Interior's Bureau of Commercial Fisheries. Because of the Massachusetts meeting site, special attention will be given to fishery developments in the New England area.

The American Fisheries Advisory Committee, comprised of individuals actively engaged in the commercial fishing industry, advises the Secretary of the Interior on matters pertaining to the commercial fishing industry. It was formed in 1955 under provisions of the Saltonstall-Kennedy Act, which makes funds available to the Department of the Interior for research on domestically-produced fishery products and other programs. Frank P. Briggs, Interior's Assistant Secretary for Fish and Wildlife is the permanent chairman of the committee.

The committee meets once or twice a year depending on circumstances. Its last meeting (17th annual meeting) was at Honolulu, Hawaii, in January 1964. That meeting emphasized oceanographic research and other matters pertaining to the commercial fisheries of Hawaii and the Central Pacific.

In addition to Assistant Secretary Briggs, other Department of the Interior representatives to attend the meeting included Thomas D. Rice, Special Assistant to the Commissioner for Fish and Wildlife, and Donald L. McKernan, Director, Bureau of Commercial Fisheries.

Note: See Commercial Fisheries Review, March 1964 p. 9.

American Samoa

AMERICAN SAMOAN-BASED TUNA FLEET DWINDLING:

The number of tuna vessels operating out of American Samoa is progressively decreasing. In mid-August 1964, there were 35 tuna vessels working out of that base, compared with around 100 vessels in 1963 during peak periods. Of those 35 vessels, 22 are Japanese, 9 Korean, 3 Formosan, and 1 Okinawan. In September, the number of Samoan-based vessels was expected to be further reduced to around 30, due to additional withdrawals contemplated by Japanese vessel owners.

The high cost of vessel operations is said to be one of the major problems for Japanese vessel owners operating out of American Samoa. Fuel, which they have to purchase through the United States packers located on Samoa, is said to cost 50 percent more than in Japan. Another problem troubling Japanese vessel owners is the increasing demand for better working conditions being made by crew members serving on vessels under 100 gross tons, which have poor accommodations.

Those problems are compelling owners of vessels under 100 gross tons to withdraw operations from the Samoan base, and it appears that the base, which Japan originally developed to aid her small and medium tuna vessel owners, is being taken over by the Koreans and Formosans.

The reduction of fleet operations in the South Pacific Ocean is said to have increased the catch rate. The catch rate for albacore is reported to have more than doubled, from 50-60 fish average per long line in 1963 to 120-130 fish in 1964. However, the fish are smaller this year, averaging 33 pounds as compared with 39.6-48.4 pounds in 1963. Japanese fishery circles are primarily attributing the higher catch rate attained this year to the absence of heavy fleet concentrations on the fishing grounds and not to the recovery of resources. (Suisan Keizai Shimbun, August 23, 1964.)

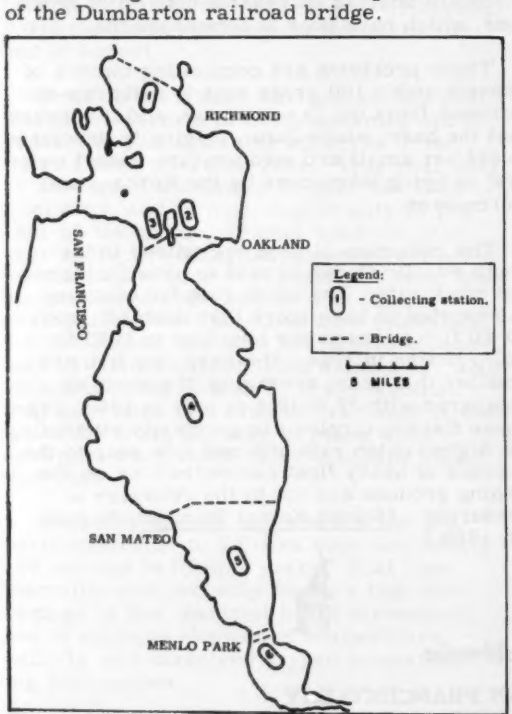
California

SAN FRANCISCO BAY INVESTIGATIONS CONTINUED:

M/V "Nautilus" Cruises 64-N3a-b-c-d-e S. F. Bay Study (February 19-21, 1964, March

14-18, April 21-24, May 16-20, June 16-20): To collect fish species and invertebrates routinely at six stations to: (1) determine their distribution and relative abundance under prevailing environmental conditions, (2) define ecological zones of San Francisco Bay, and (3) determine the food organisms of principal fish species and their availability were the objectives of this series of cruises by the California Department of Fish and Game research vessel Nautilus.

The six stations worked in the Bay study area (San Francisco Bay south of San Pablo Bay) had an average depth ranging from 20 to 50 feet, with the location of each station as follows: (Station 1) - $\frac{1}{4}$ mile south of Redrock; (Station 2) - $\frac{1}{2}$ mile east of northeast corner of Treasure Island; (Station 3) - $\frac{1}{4}$ mile west of northwest corner of Treasure Island; (Station 4) - $\frac{1}{4}$ mile east of radar pylon at north end of San Bruno Shoal; (Station 5) - $\frac{1}{2}$ mile north of No. 2 buoy at entrance to Redwood City Harbor midway between the centers of the San Mateo and Dumbarton bridges; and (Station 6) - $\frac{1}{2}$ mile east of the Dumbarton railroad bridge.



Shows collecting stations during San Francisco Bay study by the Nautilus.

Operations during this cruise included catching surface fish with a midwater trawl 25 feet on a side. This net was towed routinely for 20 minutes, but in May and June most stations were also covered by a second 20-minute tow to check adequacy of the sample. Night tows were made at stations 1, 2, and 3. Replication of tows and night drags indicated the basic 20-minute unit was collecting adequate samples.

On the February and March cruises, bottom collections were made with a 10-foot beam trawl dragged for 20 minutes, or with two 10-minute tows where debris became a problem. On the April, May, and June cruises, the bottom was sampled with a 15-foot wide otter trawl as it caught more fish per tow than the beam trawl, and picked up less trash.

Plankton tows lasting 20 minutes with a $\frac{1}{2}$-meter net were made at all stations and the material was preserved for later analysis.

Several dozen shiner perch were collected during the April cruise for bioassays. Ten live white croakers were collected for fish-sound communication studies, and some fish were also collected for the Steinhart Aquarium at San Francisco.

Surface and bottom water temperatures and salinities were taken at stations 1 through 5 but at station 6, which was shallow, surface samples only were taken.

During the first 6 months of 1964, 52 species of fish were taken bringing the total to 62 species for the San Francisco Bay study as of midsummer 1964. Five of the fish species were not taken during 1963. Those not taken were: bonehead sculpin (Artedius notospilotus) at stations 1 and 3; padded sculpin (Artedius fenestralis) at station 1; diamond turbot (Hypsopsetta guttulata) at stations 1, 2, 4, and 5; river lamprey (Lampetra fluviatilis) at station 5; and greenling sea trout (Hexagrammos decagrammus) at station 3.

Surface water temperatures ranged from 11.1° to 18.6° C. (52.0° to 65.4° F.) as compared with 11.9° to 21.1° C. (53.4° to 70.0° F.) for the same period in 1963. Strong winds are the temperature-controlling factor most of the time. Salinities were higher at all stations in 1964 due to less rainfall. The range was from 23.3 to 31.9‰ compared with 16.5 to 29.8‰ for the same period in 1963.

Note: See Commercial Fisheries Review, April 1964 p. 11; December 1963 p. 20; September 1963 p. 15.

* * * * *

ABALONE OBSERVATIONS AND GROWTH STUDIES:

M/V "Nautilus" and M/V "Mollusk" Cruises 64-N-5A and 64-M-1A-Abalone (June 29-July 13, 1964): The objectives of these cruises by the California Department of Fish and Game research vessels Nautilus and Mollusk in the coastal area from Cambria to Pt. Estero were to: (1) delineate a study area for abalone; (2) sample red abalone randomly for numbers, sizes, sex ratios, and maturity; (3) make habitat and predation observations; and (4) tag abalone for growth studies.

During this cruise, coordinates within the area of operations were plotted and charted by the vessel Nautilus using radar, depth finder, and visible reference points.

Because of poor weather conditions, charting was delayed and diving was so curtailed that underwater observations were made on only one day. Kelp appeared heavier than usual for the time of year. Considerable new shell growth at their margins was observed on abalone measuring 3 to 4 inches, but recent growth had occurred with all sizes sampled during the cruise.

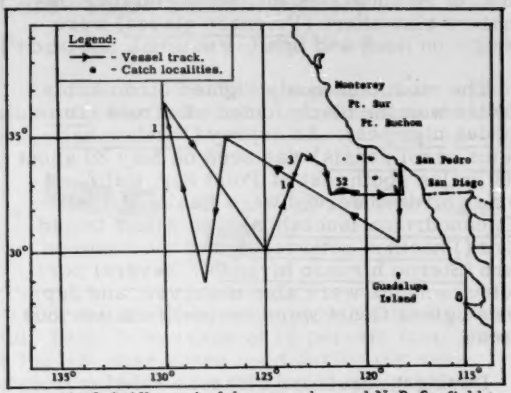
Note: See Commercial Fisheries Review, November 1963 p. 24.

* * * * *

ALBACORE TUNA MIGRATION STUDIES AND TAGGING:

M/V "N. B. Scofield" Cruise 64-S-3-Albacore (May 25-June 23, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield were to: (1) intercept the albacore tuna migration and determine its route into the mainland fishing grounds; (2) collect physical and biological data which may be related to albacore occurrence; and (3) tag and release albacore. The area of operations was on the high seas off California and northern Baja California, out to 600 miles offshore between the latitudes of Guadalupe Island and Monterey (latitudes 29°00' to 36°30' N. and to longitude 130°00' W.).

During this cruise, some 3,100 miles were scouted during daylight hours and surface trolling gear was used. A total of 57 albacore tuna were caught, with the first taken in 59.9° F. water on June 9, about 540 miles west of Pt. Buchon. Four more albacore (average 11 pounds) were caught June 18 about 360 miles west of San Diego in 59°



Cruise (64-S-3-Albacore) of the research vessel N. B. Scofield to study migrations and collect biological data related to albacore tuna.

to 60° F. water and the remainder (average 14 pounds) were taken June 20-22, about 20 to 30 miles south of San Juan Seamount.

Stomachs from 52 of the specimens were either empty or contained such food items as squid, sauries, and larval fish. Trematodes and copepods were collected from the stomachs and gill chambers. Most of the fish were 2 years old, although a 1-year old fish was taken along with 6 that were 3 years old.

Sea temperatures were obtained at regular intervals by bucket thermometer, while the thermograph provided a continuous record. The temperatures ranged from 57.4° F. northwest of San Juan Seamount to 68.4° F. at the most southerly point of the cruise west of Guadalupe Island.

A total of 78 bathythermograph (BT) casts to 450 feet were made at about 40-mile intervals; a water sample, for salinity determination, and the temperature was obtained at 10 meters by a Nansen bottle cast at each BT station; and weather observations were recorded every six hours.

Eleven night-light stations were occupied on this cruise while the vessel drifted on sea anchor. Pacific sauries (Cololabis saira) ranging from 4 or 5 individuals to schools of several hundred were observed at every station. A juvenile jack mackerel (Trachurus symmetricus), several species of lanternfish (myctophids), and several kinds of larval fish were also taken. The more common invertebrates collected included coelenterates, amphipods, heteropods, tunicates, and salps. A

total of 58 adult jack mackerel and four immature blue shark (Prionace glauca) were caught on hook and line.

The most commonly sighted bird on this cruise was the black-footed albatross (Diomedea nigripes). An osprey (Pandion haliaetus carolinensis) was seen on May 30 about 300 miles southwest of Point Sur, Calif. Other birds observed were Beal's Petrel (Oceanodroma leucorhoa), red-billed tropic bird (Phaethon aethereus), and the common tern (Sterno hirundo hirundo). Several porpoise schools were also observed, and Japanese glass floats were recovered in various areas.

During the cruise, 5 albacore ranging from 62 to 71 centimeters (24.4 to 28.0 inches) were marked with FT-1 dart tags and released.

Note: See Commercial Fisheries Review, September 1963 p. 20.

* * * * *

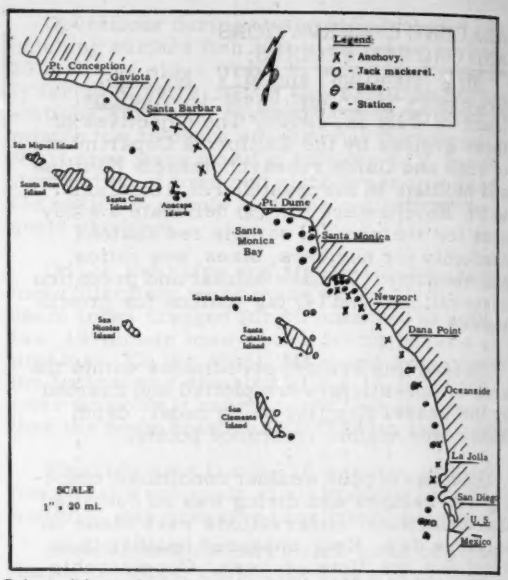
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 64-A04 Pelagic Fish (June 2-21, 1964): The purpose of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters of southern California (including the offshore islands) from Gaviota to San Diego was to: (1) survey the pelagic environment off southern California; (2) assess the density, age and size composition of pelagic species; (3) collect northern anchovy (Engraulis mordax) samples for blood genetic and electrophoretic studies; and (4) take underwater pictures and make observations of the midwater trawl in action.

The midwater trawl, blanket net, and visual scouting were the tools used in this survey. A total of 35 trawl and 21 night-light stations were occupied and 73 miles of ocean were scouted at night between stations. The Precision Depth Recorder was used during each tow and was quite effective in locating schools of fish and fish scattered near the surface.

Photomoter readings, made at most stations, varied from 0 to 99 with most of the readings in the 80's. The zero reading was caused by a heavy "red tide bloom" in Santa Monica Bay.

The only fish sighted during scouting were eight Pacific bonito (Sarda chiliensis) schools.



Pelagic fish population survey by the Alaska Cruise 64-A04 (June 2-21, 1964).

During most of the cruise there was very little phosphorescence in the water, a prerequisite to effective night scouting for fish schools.

Anchovies were the most abundant fish species caught. Other fish taken, in their order of abundance, were: jack mackerel (Trachurus symmetricus), Pacific hake (Merluccius productus), queenfish (Seriphus politus), midshipman (Porichthys sp.), Pacific pompano (Palometa simillima), and small quantities of 19 other species.

Invertebrates caught on this cruise included salps (Salpa tilesiicostata), squid, and euphausiids (Euphasia sp.). Salps were very abundant and complicated trawling by clogging net meshes. In Santa Monica Bay they were so abundant that further trawling operations there were cancelled.

A total of 18 tows was made after dark and 17 during daylight hours (normal working hours were from 1800 to 0200, sunset was about 2030 Pacific Daylight Time). All night tows were successful in catching some species of fish while only 10 of the daylight tows were successful. Only 9 of 21 night-light stations were successful.

ANCHOVIES: Anchovies were found throughout the survey area with the exception of San

Clemente Island. In the Port Hueneme-Santa Barbara area, large schools were noted on the fathometer and anchovies were caught in all but 2 tows. In general, fish in that area, were not large (about 115 millimeters, or 4.5 inches standard length).

The area from Los Angeles to San Diego did not contain any large schools (none were seen on the depth recorder or surface) but fish were scattered near the surface. Deep tows gave poor results while all surface tows were very successful. This same observation was made in the fall of 1963 during a similar pelagic fish cruise. Fish caught were larger than those in the more northerly portion of the survey area with many exceeding 130 millimeters (5.1 inches) and showing more advanced gonad development.

Samples were taken for electrophoretic studies, primarily from areas not fished by the live-bait fleet.

JACK MACKEREL: Most of the jack mackerel taken on this cruise were caught near the offshore islands by midwater trawl. Offshore samples were dominated by the 1963 year-class whereas inshore catches were all small young-of-the-year. Night tows took 95 percent of the catch.

PACIFIC HAKE: Tows made around the offshore islands and between Oceanside and San Diego took 227 hake ranging in size from 54 to 470 millimeters (2.1 to 18.5 inches) standard length. The majority were small, young-of-the-year.

One day of the cruise was spent with the Department of California Fish and Game divers making underwater observations of the midwater trawl in action. Several tows were made at various speeds and depths while the divers crawled about the net. It was noted that parts of the net were taut while other areas were slack. The divers' observations will be very valuable in redesigning the research vessel's old nets and designing new ones. No underwater pictures were taken because of adverse water conditions. Several days of cruise time was lost on this trip because of poor weather and an engine breakdown.

Note: See Commercial Fisheries Review, October 1964 p. 15; December 1963 p. 17.

Cans--Shipments for Fishery Products, January-July 1964

A total of 1,586,934 base boxes of steel and aluminum was consumed to make cans shipped

to fish and shellfish canning plants in January-July 1964, a decrease of 10 percent from the 1,762,839 base boxes used during the same period in 1963. The decline is due partially to a drop in the canning of jack mackerel and Maine sardines.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans in 1964 are derived by use of the factor 23.5 base boxes per short ton of steel. (In the years 1962 and 1963, tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

Central Pacific Fisheries Investigations

SWIMMING BEHAVIOR OF TUNA AND MACKEREL STUDIED:

Tuna and mackerel never stop swimming in their open ocean environment. This continuous swimming by those species is being studied in experimental tanks at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. Swimming is associated in varying degrees with food-seeking, gill ventilation, and depth maintenance.

In the absence of food stimuli, wavyback skipjack (Euthynnus yaito Kishinouye) which have been held in the Laboratory's shoreside tanks for a month usually swim at a uniform slow speed (0.75 meters per second or 2.4 feet per second for a 0.42-meter or 1.3-foot fork-length fish) throughout the day and night. If deprived of food for several days, their swimming speed decreases to 0.55 meters or 1.8 feet per second but increases after a meal. Since other animals, such as mice, become more active when deprived of food for several days, it appears that the slow continuous speed of tuna is not controlled by the food drive. Further evidence of this is that tuna continue to swim at night although feeding is confined to the daylight hours.

When tuna are alerted to the presence of food they swim rapidly if they have not eaten recently. When food odor is introduced into the tank, wavyback skipjack which had not been fed for 2 to 5 hours increase their speed to 1.5 meters or 4.8 feet a second; those not fed for 15 hours or more increase their speed to 1.8 meters or 5.8 feet a second. At sea this behavior characteristic of tuna may increase the probability of their contacting food outside of visual range which they have sensed by chemical means.

Tuna must swim continuously to ventilate their gills and to maintain their swimming depth. Their slow continuous swimming speed may be the slowest possible for adequate ventilation, the slowest possible to maintain depth, or it may be the slowest possible for both.

Wavyback skipjack tuna have no gas bladder and are more dense than sea water (body density equals 1.08 grams per cubic centimeter, sea water density equals 1.02 grams per cubic centimeter); therefore, a fish weighing 1,080 grams (about 38 ounces) in air, still weighs 60 grams (about 2 ounces) submerged in sea water. These fish avoid sinking by continuously swimming; when they swim forward, hydrodynamic lift is exerted against their pectoral fins which act as hydrofoils. The amount of hydrodynamic lift exerted varies with their swimming speed. At slow speeds, wavyback skipjack extend their pectoral fins more than 90 percent of the time. As they increase their speed, they retract their pectoral fins for longer periods apparently to maintain swimming depth. Continuous extension at faster speeds would result in the fish rising to the surface. At speeds greater than 1.2 meters per second or 3.8 feet a second they extend those fins only part way and rarely more than 20 percent of the time.

The amount of gill ventilation obtained from a given speed is controlled in part by variations in the angle at which the mouth is held open and by the percent of time the mouth is completely closed. Pacific bonito (Sarda chiliensis) observed at Marineland of the Pacific in Palos Verdes, Calif., closed their mouths up to 42 percent of the time at slow speeds and had their pectoral fins extended almost continuously. It appears that even slower speeds than are required for hydrostatic lift would probably suffice for gill ventilation of tuna.

Studies are in progress at the Bureau's Kewalo Basin Laboratory in Honolulu, to learn more about the interaction between the gill ventilation and hydrostatic functions of continuous swimming in tuna and to determine how these functional components affect their behavior and activity.

* * * * *

SKIPJACK TUNA BLOOD-TYPING STUDIES EXPANDED:

The following summary of skipjack tuna blood-typing studies through July 1964 was issued by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii:

As a result of blood-typing studies in previous years, it is known that the skipjack tuna population distribution in the central Pacific can be broken down into a number of isolated breeding subpopulations, and that at least two different subpopulations of skipjack have appeared in Hawaiian waters. Those populations have been tentatively designated as Populations I and II.

To understand monthly features of the availability off Hawaii of the subpopulations, intensive observations have been made since mid-1963 by using blood samples taken at local fish markets or the cannery. The results show that Population I appeared intermittently during October 1963 and then in 1964 during the months of February, March, May, and June, while Population II was usually dominant from November through April. The alternative appearance of two populations was assumed to be possibly associated with changes of oceanographic environments in Hawaiian waters.

To attempt to clarify that assumption, a series of cruises by the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert has been carried out since June 1964. The missions included the collection of blood samples from each skipjack school encountered, and oceanographic observations such as salinity, surface-water temperatures, and bathythermographic data. Although the results of the preliminary observations are encouraging, definite results can not be determined until the present investigation is completed.

Basic studies have been emphasized in order to improve large-scale investigations.

Such work includes the development of potential reagents for typing and finding new blood factors as well as determining their genetics. At present, 32 individual differences have been recognized as a combination of the 3 independent blood group systems. Expanded knowledge of those hereditary characteristics will be valuable in solving future problems.

* * * * *

TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

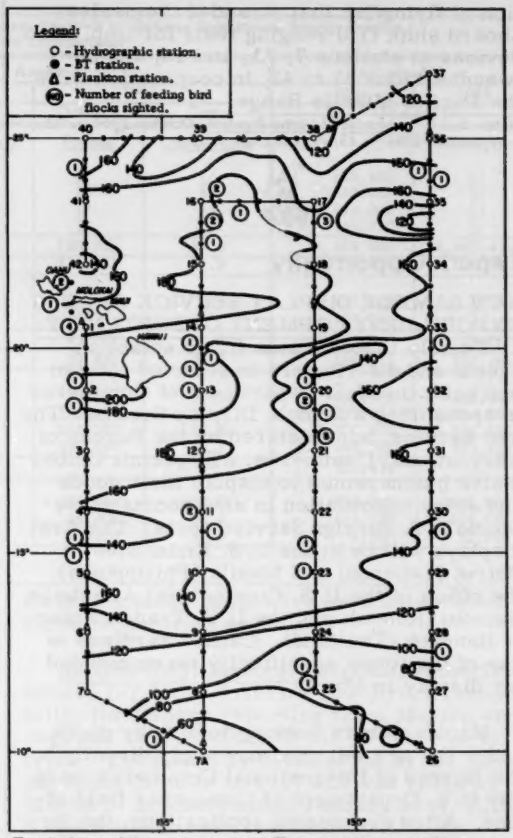
M/V "Townsend Cromwell" Cruise 6 (July 13-August 1, 1964): This was the sixth in a series of oceanographic cruises to determine rates of change in the distribution of properties in the trade wind zone of the central North Pacific. The research vessel Townsend Cromwell of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, operated in the central North Pacific bounded by latitudes 10° N., 27° N. and longitudes 148° W., 158° W. during this cruise, which was completed August 1, 1964.

A total of 42 oceanographic stations were occupied along the cruise track and temperatures and samples for salinity analysis were obtained at each station at 20 depths to 1,500 meters. Deep casts to 4,000 and 5,000 meters had to be canceled because of a defect in the hydrowire.

The most noticeable change in the flow pattern during July was the relaxation of the currents in the area between 13° and 16° N. latitude, where a large counterclockwise eddy had been detected during the vessel's previous cruise (June 15-July 5, 1964). This relaxation appeared to be compensated for by an intensification of the North Equatorial Current south of 13° N. latitude.

Surface temperatures during this cruise showed a continuing trend of warming as indicated by the retreat of the 24° isotherm to the extreme northeast sector of the cruise area and by the appearance of the 27° isotherm in the southern section. Field plots of the oxygen distribution showed a pattern similar to the known oxygen distribution of the cruise region.

During the cruise, 49 feeding bird flocks were sighted, 4 of which were associated with skipjack tuna. Those flocks were more widely scattered throughout the cruise area than were the 28 sightings of the previous cruise. The standard watch for bird flocks and fish schools was maintained during daylight hours.



Track chart of the research vessel Townsend Cromwell Cruise 6 (July 13-August 1, 1964), showing depth contours of the 20° C. isotherm in meters.

Vessel operations on this cruise included: (1) Bathythermograms (BT) at 20-mile and at 10-mile intervals; (2) surface bucket temperatures and water samples for salinity analysis at each bathythermograph observation; (3) dissolved oxygen determinations for each water sample; (4) release of ten plastic enclosed drift cards at 30-mile intervals along the entire cruise track; (5) standard marine weather observations; (6) radiation measurements from the sun and sky; (7) colored photographs of cloud formations; (8) surface plankton tows, for a period of one-half hour, using a 1-meter net at 2000 daily; (9) collection and preserva-

tion of flyingfish that stranded themselves aboard ship; (10) ranging tests for implosion devices at stations 7, 7A, and 16, and between stations 37 to 42, in cooperation with the Pacific Missile Range.

Note: See Commercial Fisheries Review, October 1964 p. 22; September 1964 p. 15; August 1964 p. 17.

Export Opportunity

NEW SAMPLE DISPLAY SERVICE OFFERS EXPORT DEVELOPMENT OPPORTUNITY: To help United States firms establish agents and distributors in selected foreign markets, the U. S. Department of Commerce is sponsoring a Sample Display Service. The new service, administered by the Bureau of International Commerce, will permit United States businessmen to display their goods and sales information in showrooms at selected U. S. Foreign Service posts. The first displays will be at the U. S. Embassies in Beirut (Lebanon) and Manila (Philippines); the office of the U. S. Commercial Attache in Nairobi (Kenya); and the U. S. Trade Center in Bangkok (Thailand). Canned sardines is one of the items specifically recommended for display in Manila.

Manufacturers seeking to display goods under the new service may apply directly to the Bureau of International Commerce or to any U. S. Department of Commerce field office. After processing applications, the Bureau of International Commerce will send shipping instructions directly to the manufacturers.

Manufacturers taking advantage of the new service will supply merchandise samples and pay the cost of one-way freight from plant to foreign port of entry. The U. S. Department of Commerce will provide the foreign display facilities, the agent-finding service, customs and storage services abroad, and if necessary, take care of the return freight service. The displays will be geared to smaller products, but large, heavy products may be put on exhibit through the use of cutaways, models, films, or slides.

Samples and literature will be displayed for 30 days. Sample displays will be under the management of the U. S. Commercial Attache in each city. Sample display staffs will mount the exhibits, campaign to attract agents and distributors to the showrooms, demonstrate products, prepare summary reports for exhibitors, recommend the most qualified of the foreign representatives who express interest in a product, and supply a business report on each of those representatives. Exhibitors will then negotiate directly with the representatives they select. (International Commerce, September 7, 1964, U.S. Department of Commerce.)

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1964: Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased in August 1964 than in the previous month. The decline was 10.8 percent in quantity and 2.4 percent in value. Compared with the same month in the previous year, purchases in August 1964 were down 4.5 percent in quantity and 3.4 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, August 1964 with Comparisons

QUANTITY				VALUE			
Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
1,899	1,989	17,413	15,820	1,142	1,182	9,355	8,950

Total purchases in the first 8 months of 1964 were up 10.1 percent in quantity and 4.5 percent in value from those in the same period of the previous year. In January-August 1964 there were larger purchases of shrimp and scallops, but noticeably lower purchases of cod fillets, ocean perch fillets, and swordfish steaks (see table 2).

Canned: In the first 8 months of 1964, total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 71.4 percent in quantity and 74.5 percent in value from those in the same period of 1963. The increase was due to larger purchases of tuna and salmon. The gain was partly offset by smaller purchases of canned sardines (see table 3).

Freeze-Dried: Fishery purchases for the Armed Forces in August 1964 included 32,564 pounds of freeze-dried groundfish (cod or

Table 2 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, August 1964 with Comparisons

Product	August				January-August	
	1964		1963		1964	1963
	Quantity	Cost	Quantity	Cost	Quantity	
	Pounds	Cents/Pound	Pounds	Cents/Pound	(Pounds)	
Shrimp:						
Raw headless	57,000	84.1	1/	1/	855,450	1/
Peeled and deveined	254,708	108.0	1/	1/	863,422	1/
Breaded	296,100	68.1	1/	1/	2/2,815,000	1/
Molded and breaded	75,000	59.0	1/	1/	349,770	1/
Total shrimp	682,808	83.3	780,922	82.8	4,883,642	4,465,414
Scallops	112,230	59.9	236,285	52.9	2,103,090	1,886,650
Oysters:						
Eastern	45,952	97.6	1/	1/	557,582	1/
Pacific	19,464	62.9	1/	1/	191,936	1/
Total oysters	65,416	87.3	95,789	101.9	749,518	757,778
Clams	16,542	31.3	19,482	33.3	198,351	181,164
Fillets:						
Cod	20,500	26.5	34,528	28.4	302,166	455,849
Flounder	170,100	27.6	199,120	29.6	2/2,207,866	2,184,254
Ocean perch	246,500	25.6	281,093	29.6	2,370,420	2,584,625
Haddock	92,400	31.0	135,036	33.7	2/1,348,854	1,523,469
Haddock portions	135,224	48.6	-	-	155,814	-
Steaks:						
Halibut	113,005	41.8	124,844	39.0	873,077	937,021
Salmon	19,300	69.0	14,406	61.2	144,525	128,587
Swordfish	1,150	48.5	3,020	52.8	9,580	22,750

1/Breakdown not available.
2/Revised.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, August 1964 with Comparisons

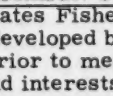
Product	QUANTITY				VALUE			
	Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	599	-	3,216	2,064	254	-	1,455	1,007
Salmon	1/	-	679	18	2/	-	416	12
Sardine	67	11	242	332	32	4	143	135

1/Less than 500 pounds.
2/Less than $500.

haddock) with an average value of $5.40 per pound, and 2,239 pounds of freeze-dried shrimp with an average value of $10.46 per pound.

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Oct. 1964 p. 23.



Foreign Fishery Reporting

UNITED STATES FISHERY ATTACHE PROGRAM IN FOREIGN COUNTRIES:

The United States Fishery Attache Program has been developed by the Departments of State and Interior to meet the growing responsibilities and interests of the United States Government and domestic fishing industry in foreign fisheries. To date, four fishery attache posts have been established in foreign countries as follows:

Mexico City, Mexico: Regional fisheries officer for Latin America has direct responsibility for fishery reporting from Mexico and regional responsibilities for 18 other countries. The post was established by the Department of State in 1957 and was filled by Milton J. Lindner; since January 1964, Richard S. Croker has been the Fishery Attache.

Tokyo, Japan: This is a one-country post, established by the Department of State in 1958. The first incumbent was Wilvan G. Van Campen; present incumbent is Arnie J. Suomela, who took up his duties as Fishery Attache in April 1961.

Copenhagen, Denmark: Fishery attache for Europe has direct responsibility for fishery reporting from Denmark and regional responsibilities for all other European countries, including the U. S. S. R. The post was established by the Department of State in 1961, and Andrew W. Anderson was selected as the first incumbent. In August 1964, an Assistant Fishery Attache, Salvatore DiPalma, was appointed as a result of the increased workload and travel requirements of that post.

Abidjan, Ivory Coast: The regional fisheries post for West and South Africa was es-

tablished in 1963; the position was filled in January 1964 by George B. Gross.

Freezing

USE OF LIQUID NITROGEN TO FREEZE FISH STUDIED:

The relatively new technique of using liquid nitrogen to freeze fishery products offers considerable promise to the fishing industry in improving process procedures as well as quality of the product. This is particularly true in the production of individually quick-frozen items, where throughput will be greatly increased; weight losses (which run as high as 10 percent in blast freezers) will be eliminated; and color, flavor, and texture may be better maintained than when conventional freezing methods are used.

But there are several technological problems connected with liquid nitrogen freezing that may cause difficulty if the process is adopted without sufficient research. Chief among those problems is that too rapid cooling will cause the product to crack or even to shatter. Generally the damage is very obvious, but occasionally it may not show up until the product is subjected to further processing such as freeze-drying.

As part of the project on the Investigation of New Refrigeration Techniques conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass., tests were made to delineate precisely the parameters involved in liquid nitrogen freezing of various fishery products. In preliminary tests with haddock fillets it was found that no damage occurs when nominal freezing rates of 2.0 to 7.0 centimeters per hour are used. With conventional equipment a nominal freezing rate above 0.5 centimeters per hour is considered to be good commercial practice.

Fur Seals

PRIBILOF ISLANDS FUR SEAL SKIN HARVEST, 1964:

During the 1964 sealing season, the harvest of fur seal skins by the Pribilof Islands staff of the U. S. Bureau of Commercial Fisheries amounted to 64,209 skins. Of that total, 48,602 skins were harvested on St. Paul Island and 15,607 skins on St. Georges Island.

Removal of blubber is an early step in processing seal skins. Trained workers are shown performing this preliminary step in skin processing on St. Paul Island.

The fur seal skin harvest in 1964 was below the 1963 harvest by 21,045 skins. In 1963, a total of 85,254 skins was harvested as compared with 77,915 skins in 1962.

Note: See Commercial Fisheries Review, January 1963 p. 28.

Great Lakes Fisheries Explorations and Gear Development

STUDIES ON TRAWLING OF COMMERCIAL SPECIES IN LAKE SUPERIOR CONTINUED:

M/V "Kaho" Cruise 20 (August 7-22, 1964): Investigating possible ways to improve methods for catching and handling Lake Superior commercial fish species was the principal objective of this 16-day cruise in Lake Superior from Whitefish Bay to the Keweenaw Peninsula. This was the second of three scheduled cruises for that purpose by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Kaho.

Although primary consideration was given to determining the seasonal availability of the various species of fish to bottom trawls and locating additional areas suitable for trawling, other activities of the cruise were concerned

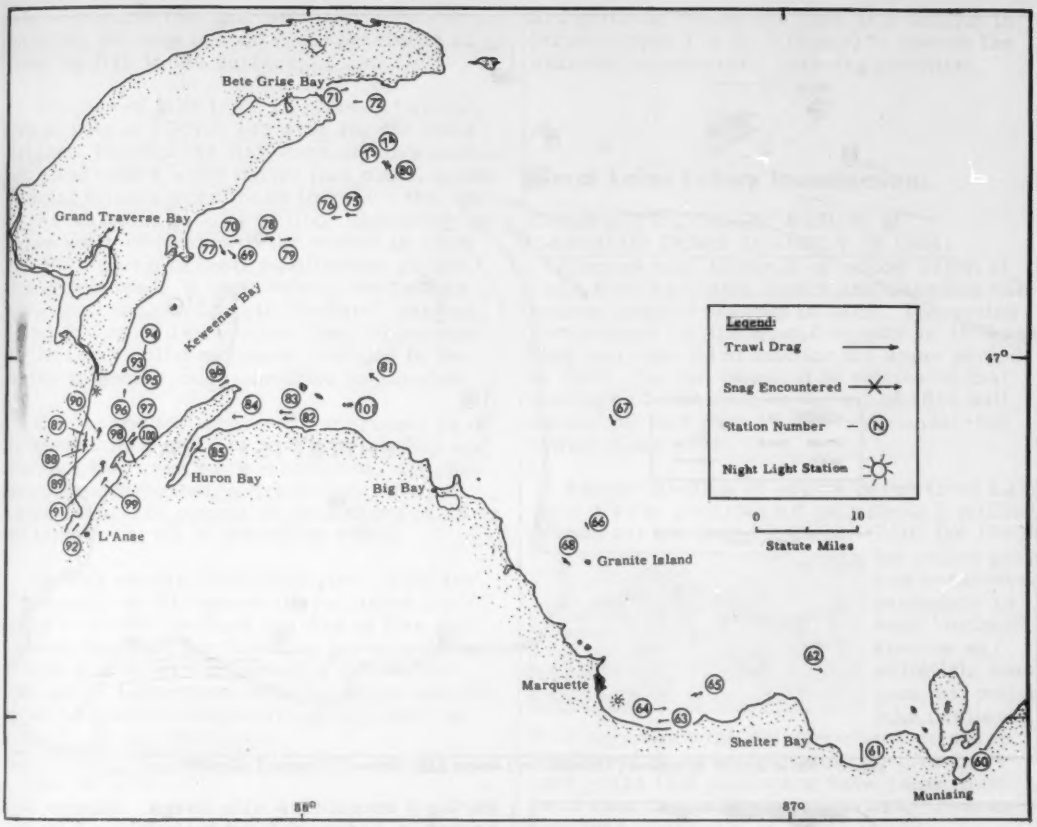


Fig. 1 - Shows area of operations (Munising to Keweenaw Peninsula) during Kaho Cruise 20, August 7-22, 1964.

with (1) attempts to attract fish with submersible lights, (2) collecting length-frequency data on chub, herring, and alewife, (3) obtaining samples of fish for botulism studies, and (4) collecting water samples for limnological investigations.

Good to excellent catches of chub were taken east of the Keweenaw Peninsula near Bete Grise Bay and in Keweenaw Bay, and fair catches of smelt were taken in Keweenaw Bay and Huron Bay. Catches of cisco (lake herring) were insiginficant with the best catch (35 pounds) recorded from Huron Bay. Only two significant catches of common whitefish were taken during the cruise. Dense concentrations of fish were located in several areas monitored during Kaho Cruise 18 (May 25-June 10, 1964). Direction of tow greatly influenced the catch on several drags indicating direction of water current to be a contributing factor in trawl catch rates.

Attempts to attract fish to a special 500-watt white light lamp near the surface were unsuccessful.

Additional trawlable grounds in deeper than 60 fathoms were located north of Granite Island and south of Manitou Island using a high-resolution, white-line-type echo-sounder.

A total of 56 drags was made during the cruise with a 52-foot (headrope) Gulf of Mexico-type fish trawl. Of the total, 42 were completed from Munising west to the Keweenaw Peninsula and 12 in and near Whitefish Bay. All drags lasted 30 minutes except 8 which were terminated early when the net either became fouled on bottom obstructions

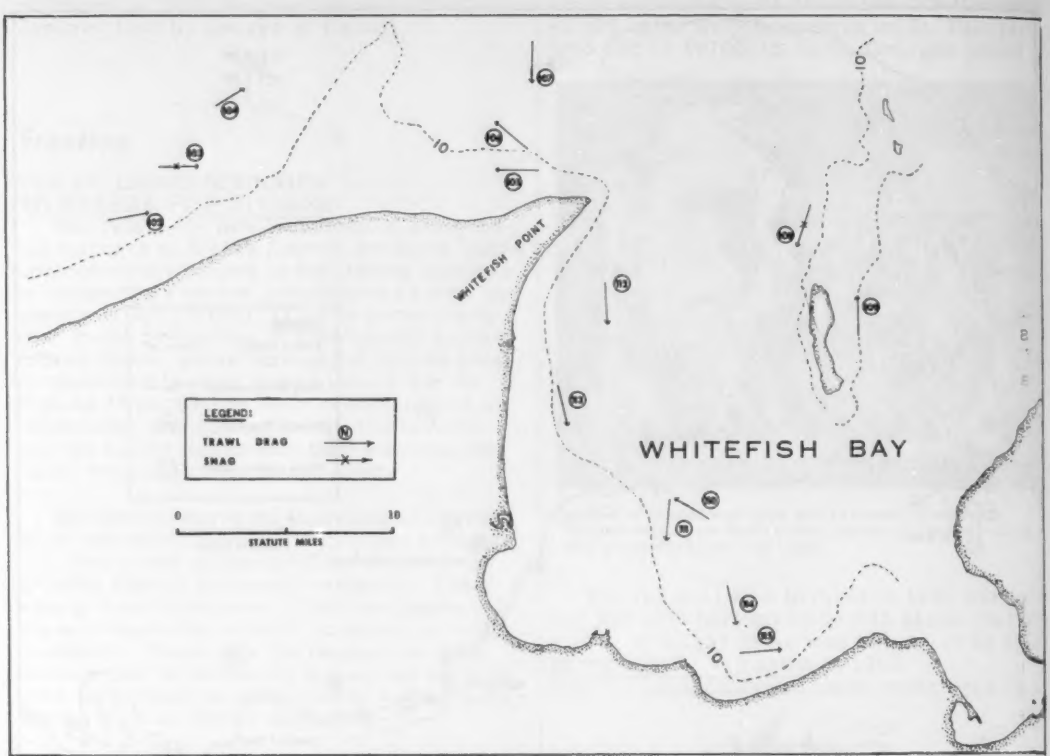


Fig. 2 - Shows area of operations (Whitefish Bay) during Kaho Cruise 20, August 7-22, 1964.

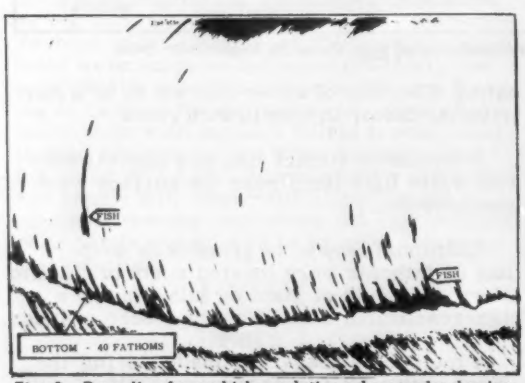


Fig. 3 - Recording from a high-resolution echo-sounder showing the bottom profile and fish on the bottom and at midwater depths. Recording was made at station 75, south of Bete Grise Bay, at a depth of 40 fathoms. Catch consisted of 520 pounds of chubs.

or because of the presence of gill nets in the area, and one drag which was extended to 60 minutes to study the production rates of longer drags. Severe damage to the trawl occurred during 2 encounters with snags. Stumps, logs, branches, and rocks were picked up in 7 drags resulting in only minor damage to the trawl on 4 such occasions and no damage in the remaining 3 encounters.

Commercially significant catches of chub (over 200 pounds per 30-minute drag) were taken off the east shore of Keweenaw Peninsula, Keweenaw Bay, and Huron Bay in 35-45, 30-40, and 11-15 fathoms, respectively. The best catch of chub (1,210 pounds) was in 40 fathoms in Keweenaw Bay. The catch consisted of about 70 percent (by weight) or 850 pounds of chub over 9 inches long. Most catches of smelt (ranging up to 240 pounds) occurred in the 8- to 16-fathom depth range and were composed chiefly of 36 count (number per pound) fish. One 45-pound catch of smelt from 25 fathoms in Keweenaw Bay was largely of 16-count fish.

Only small quantities of cisco (lake herring) were caught throughout the areas fished. After-dark experiments with a light in areas

where commercial gill-net fishermen were catching herring proved unsuccessful in attracting fish to the surface.

Catches of lake trout occurred at an average rate of 10 fish per drag for the entire cruise. Most of the fish were under 9 inches long and only 3 were native (not planted) fish. Special efforts were made to return the fish to the water in good condition. Recovery live tanks were used aboard the vessel to allow the fish to regain their equilibrium before being released. A hypodermic needle was also used successfully to "deflate" bloated fish. It was estimated that over 90 percent of the trout collected were returned to the water in good enough condition to survive.

During the last phase of the cruise, 14 of 15 established stations in Whitefish Bay and surrounding area were monitored. Catches were generally insignificant with the best catch being 120 pounds of chub taken in 35-40 fathoms north of Whitefish Point.

On this cruise, bacteriologists from the University of Wisconsin accompanied the Kaho to collect various species of fish and bottom material for botulism investigations. A biologist from the Bureau's Ann Arbor Biological Laboratory also accompanied the vessel to record length-frequency data on alewife, chubs, and cisco.

Note: See Commercial Fisheries Review, September 1964 p. 20; August 1964 p. 25.

* * * * *

SEASONAL DISTRIBUTION AND ABUNDANCE STUDIES OF ALEWIFE, CHUB, AND YELLOW PERCH IN LAKE MICHIGAN CONTINUED:

M/V "Kaho" Cruise 21: To extend knowledge of the seasonal distribution and abundance of alewife, chub, and yellow perch in Lake Michigan and their availability to bottom trawls was the primary purpose of this cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing and gear research vessel Kaho. The cruise announcement on August 18, 1964, indicated the vessel would conduct trawl explorations in northern Lake Michigan and Green Bay (August 25-September 3, 1964) and in lower and central Lake Michigan (September 9-18, 1964). The cruise plan called for: (1) echo-sounding with high-resolution equipment to record bottom and off-bottom fish concentrations; and (2) trawling with a 52-foot trawl at standard stations (30-minute tows at 5-fathom intervals from 5 to 50 fathoms) to assess the seasonal commercial trawling potential.

Great Lakes Fishery Investigations

LAKE ERIE YELLOW PERCH LANDINGS DOWN SHARPLY IN 1964:

Commercial landings of yellow perch at Lake Erie by United States and Canadian fishermen dropped sharply in 1964. The yellow perch catch for the first 6 months in 1964 was less than one-third that for the same period in 1963. On that basis, it is estimated that landings of that species for all of 1964 will amount to less than 10 million pounds--the lowest since 1955.

Annual landings of yellow perch from Lake Erie have averaged only about 7 million pounds for the past 50 years. Until the 1950's, the yellow perch was considered secondary to such "money" species as whitefish, blue pike, and yellow pike (walleye). It is only since the disappearance or sharp decline of those higher value species in recent years that producers have come to depend upon the yellow perch to keep them in business.

Yellow Perch

The yellow perch fishery (United States and Canada) reached an all-time high production level in 1956-63, averaging well over 20 million pounds a year. Why then, the sudden drop in landings in 1964? Two factors are believed principally responsible--fluctuations in year-class strength (i.e., numbers of fish that hatch and survive in a given year) and a pronounced slowing of growth rate in recent years.

Relatively strong year-classes of yellow perch were produced in the mid-1950's, topped by an exceptionally good hatch in 1959. Landings from those combined year-classes brought landings to the record highs that were sustained through 1963. But during the more recent of those high production years, the hatches of yellow perch were not always good. The 1960 year-class, for example, is known to have been very weak. That poor

year-class is the one upon which the fishery must depend for the bulk of its catch in 1964.

Concurrent with the large populations that permitted high production in 1956-63 has come a slowing of the growth rate. As late as 1956, many of the yellow perch landed in Lake Erie's western basin were fish that had required only three growing seasons to reach a length of 8½ inches (then the legal minimum length in Ohio). By 1959, yellow perch required four growing seasons to attain the same size. By 1964, at least four years were required for most perch to grow to the shorter legal length of 8.0 inches (the minimum legal length in Ohio since May 1, 1964). The declining growth rate in 1959-64 is illustrated in the table of average lengths of perch taken in trawls at the end of each growing season in those years. The decline may be a natural consequence of increased competition for space and food--although from what is known most small forage fishes were maintaining themselves in large numbers in 1959-64. (Just as perch grew faster when the population was less dense, the relatively scarce yellow pike or walleye are now growing far more rapidly than during the years when they were abundant).

The 1961 year-class of yellow perch was only fair, but the hatch in 1962 was unusually large--the largest on record. If the growth rate of those two year-classes had been similar to that of fish living in the lake in the mid-1950's, both would by now have entered the commercial fishery. Actually, only the largest individuals of the 1961 year-class were taken during the spring of 1964. The 1962 year-class had not entered the commercial fishery by midsummer, although large numbers--nearly all less than 8 inches long--were being taken by anglers. It is unlikely that this year-class will be represented in significant numbers during the balance of 1964, in spite of the reduced size limit of Ohio. (The change in regulation has, nevertheless, benefited the fishermen to some extent. About 20 percent of the legal-size perch now being landed in Ohio are less than 8½ inches long. Many of those smaller fish are of the 1961 year-class.)

Average Total Length of Yellow Perch Taken in Trawls in Western Lake Erie at the End of the Growing Season, 1959-64

Seasons of Growth Completed	Year-Class					
	1959	1960	1961	1962	1963	1964
	(Inches)					
1	4.0	3.6	3.6	3.2	3.3	1/3.3
2	6.9	6.7	6.4	5.8	1/5.8	-
3	7.8	7.5	7.4	1/7.2	-	-
4	8.5	8.2	1/8.0	-	-	-
5	9.2	1/8.8	-	-	-	-
6	1/9.6	-	-	-	-	-

1/Estimated length at end of growing season based on length-frequency data collected in August 1964.

Earlier predictions that the 1962 hatch of yellow perch would begin to enter the fishery by the fall of 1964 will not be realized because of the slower growth rate. Furthermore, experimental trawling during the past year has indicated a heavier natural mortality of perch of that extremely large year-class than was anticipated (undoubtedly due in part to extensive "die-offs" in the western and central basin during the past two summers). The outlook therefore is not as encouraging as it appeared to be earlier, even though large numbers of the 1962 year-class are still present.

Barring catastrophies such as additional severe "die-offs," the yellow perch catch should pick up again in 1965 and improve further in 1966 when the presumed still-strong 1962 year-class is expected to be completely available to the fishery.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-20 (August 21-September 1, 1964): Shrimp distribution studies in the Gulf of Mexico were continued during this cruise by the chartered research vessel Gus III of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Eight statistical areas were covered and standard 3-hour tows with a 45-foot Gulf shrimp trawl were made.

During this cruise, 34 tows with a 45-foot flat traw, 63 plankton tows, 59 bathythermograph, and 41 Nansen bottle samples were taken. Also, 162 drift bottles were cast at 27 stations, and one 24-hour current meter station was occupied.

Catches were generally spotty and were only fairly productive in three of the areas worked where catches of brown shrimp ranged from 32 to 59 pounds. Area 16 yielded a good catch (48 pounds) of 15-20 count brown shrimp from the over 20-fathom depth range. The other two depth ranges in that area yielded only a scattering of white and pink shrimp.

The largest catch of brown shrimp of the cruise was from area 20--a total of 59 pounds

pounds (mostly 25-30 count) from all three depth ranges. That area also yielded 5 pounds of 15-20 count pink shrimp from the 0-10 fathom depth.

Area 18 accounted for a total of 43 pounds with the largest catch (27 pounds of mostly brown 21-25 count shrimp) from the 10-20 fathom depth. A 14-pound catch from the 0-10 fathom depth range of that area was made up of 8 pounds of 21-25 count white shrimp and 6 pounds of small brown shrimp (68 count).

A total of 21 pounds of white 21-25 count shrimp was taken from 0-10 fathoms in area 17, together with 3 pounds of small brown shrimp. Shrimp catches were small in the three depth ranges of the other areas worked during this cruise.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, October 1964 p. 26.

Gulf States Marine Fisheries Commission

ANNUAL MEETING IN BROWNSVILLE, TEXAS:

The Fifteenth Annual Meeting of the Gulf States Marine Fisheries Commission was held in Brownsville, Tex., October 15-16, 1964. The opening general session on October 15 included an address by the Commissioner, 8th U. S. Coast Guard District, and an address by the U. S. Bureau of Commercial Fisheries Chief Adviser on Oceanographic Research.

At the general session on October 16, the Texas Parks and Wildlife Department gave a progress report on Texas blue crab studies. The U. S. Bureau of Commercial Fisheries presented a film on shrimp explorations in the southwest Caribbean, and gave a progress report on the Commercial Fisheries Research and Development Act (P. L. 88-309).

Industrial Fishery Products

U. S. FISH MEAL, OIL, AND SOLUBLES: Production by Areas, August 1964: Preliminary data on U. S. production of fish oil, and solubles for August 1964 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production[1] of Fish Meal, Oil, and Solubles by Areas, August 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized[3]
	Short Tons	1,000 Pounds	. . . (Short Tons) . . .	
August 1964:				
East & Gulf Coasts	29,605	23,174	12,530	-
West Coast[2]	3,732	2,558	1,871	-
Total	33,337	25,732	14,401	-
Jan.-Aug. 1964 Total	158,966	132,411	65,037	-
Jan.-Aug. 1963 Total	170,779	133,924	67,458	7,134

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.
3/Includes condensed fish.

* * * * *

Production, July 1964: During July 1964, a total of 41,663 tons of fish meal and scrap and 31.8 million pounds of marine animal oils was produced in the United States. Compared with July 1963 this was an increase of 3,171 tons in meal, and about 2.8 million pounds in oil production. Fish solubles production amounted to 16,271 tons--an increase of 1,093 tons compared with July 1963.

Menhaden meal production for July 1964 amounted to 33,089 tons--an increase of 1,981 tons compared with July 1963, and menhaden oil totaled 25.9 million pounds--an in-

U. S. Production of Fish Meal, Oil, and Solubles, July 1964[1] with Comparisons

Product	July		Jan.-July		Total
	1/1964	1963	1/1964	1963	1963
	. . . (Short Tons) . . .				
Fish Meal and Scrap:					
Herring	3,256	2,320	4,940	2,619	7,537
Menhaden 2/	33,089	31,108	96,110	99,705	181,750
Tuna and mackerel	1,741	1,282	10,207	11,651	26,957
Unclassified	3,577	3,782	14,372	15,569	22,415
Total	41,663	38,492	125,629	129,544	238,659
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	14,793
Grand total meal and scrap	3/	3/	3/	3/	253,452
Fish solubles:					
Menhaden	14,758	13,096	39,878	40,073	74,831
Other	1,513	2,082	10,758	14,089	25,347
Total	16,271	15,178	50,636	54,162	100,178
Homogenized condensed fish	-	2,531	-	6,372	7,224
	. . . (1,000 Pounds) . . .				
Oil, body:					
Herring	3,086	2,021	5,234	2,515	5,709
Menhaden 2/	25,898	25,391	94,630	90,292	167,635
Tuna and mackerel	499	378	2,257	2,030	5,735
Other (including whale)	2,299	1,200	4,558	3,742	6,748
Total oil	31,782	28,990	106,679	98,579	185,827

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Not available on a monthly basis.

crease of 507,000 pounds over July 1963. Herring meal production amounted to 3,256 tons--an increase of 936 tons as compared with July 1963. Oil produced from herring amounted to about 3.1 million pounds, an increase of 1.1 million pounds compared with July 1963. Tuna and mackerel meal production (1,741 tons) showed an increase of 459 tons, and tuna and mackerel oil production amounted to 449,000 pounds--up 121,000 pounds.

* * * * *

Major Indicators for U. S. Supply, July 1964: United States production of fish meal in July 1964 was higher by 8.2 percent as compared with July 1963. Production of fish oil was up by 9.6 percent and that of fish solubles decreased 8.1 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, July 1964

Item and Period	1/1964	1963	1962	1961	1960
	. . . . (Short Tons)				
Fish Meal:					
Production:					
July	41,663	38,492	55,602	63,435	56,262
January-June 2/	83,966	91,052	121,836	102,502	80,231
Year 3/	-	253,452	312,259	311,265	290,137
Imports:					
July	28,863	43,223	25,857	18,710	13,131
January-June	256,429	181,934	140,886	107,826	66,375
Year	-	383,107	252,307	217,845	131,561
Fish Solubles 4/:					
Production:					
July	16,271	17,709	22,207	22,589	18,876
January-June 2/	34,365	42,825	51,507	40,200	36,946
Year	-	107,402	124,334	112,241	98,929
Imports:					
July	1,506	330	306	708	96
January-June	2,051	2,439	4,290	1,219	2,518
Year	-	6,773	6,308	6,739	3,174
	. . . . (1,000 Lbs.)				
Fish Oils:					
Production:					
July	31,782	28,990	47,695	57,239	40,487
January-June 2/	74,897	69,589	95,622	89,026	56,340
Year	-	185,827	250,075	258,118	209,143
Exports:					
July	40,449	29,343	128	4,421	40,603
January-June	56,139	97,806	63,005	68,127	52,820
Year	-	262,342	123,050	122,486	143,609

1/Preliminary.
2/Data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.
3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.
4/Includes homogenized fish.

* * * * *

U.S. FISH MEAL AND SOLUBLES:

Production and Imports, January-July 1964: Based on domestic production and imports, the United States available supply of fish meal for January-July 1964 amounted to 410,921 short tons--56,220 tons (or 15.8 percent) more than during January-July 1963. Domestic production was 3,915 tons (or 3.0 percent) less, but imports were 60,135 tons (or 26.7 percent) higher than in January-July 1963. Peru continued to lead other countries with shipments of 227,325 tons.

The United States supply of fish solubles (including homogenized fish) during January-July 1964 amounted to 54,193 tons--a decrease of 14.4 percent as compared with the same period in 1963. Domestic production dropped 16.4 percent but imports of fish solubles increased 28.5 percent.

U. S. Supply of Fish Meal and Solubles, January-July 1964 with Comparisons

Item	Jan.-July 1/1964	Jan.-July 1963	Total 1963
	. . . (Short Tons). . .		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	96,110	99,705	181,750
Tuna and mackerel	10,207	11,651	26,957
Herring	4,940	2,619	7,537
Other	14,372	15,569	37,208
Total production	125,629	129,544	253,452
Imports:			
Canada	34,509	30,752	50,925
Peru	227,325	167,542	291,544
Chile	10,587	19,088	24,249
Norway	-	1,819	1,819
So. Africa Republic	10,738	4,826	12,296
Other countries	2,133	1,130	2,274
Total imports	285,292	225,157	383,107
Available fish meal supply	410,921	354,701	636,559
Fish Solubles:			
Domestic production	50,636	2/60,534	2/107,402
Imports:			
Canada	1,162	1,541	2,034
Iceland	-	105	160
So. Africa Republic	860	191	411
Other countries	1,535	932	4,168
Total imports	3,557	2,769	6,773
Available fish solubles supply	54,193	63,303	114,175

1/Preliminary.
2/50-percent solids. Includes production of homogenized condensed fish.

* * * * *

MENHADEN CATCHES NORTH OF CHESAPEAKE BAY DECLINE:

A serious decline in menhaden catches during the 1964 fishing season in all areas north of Chesapeake Bay has had particularly serious effects on industrial fishery products processors in New Jersey, where the supply has been dwindling for several years. Chesapeake Bay has been affected also, for although the total menhaden catch for that region is about the same as in previous years, the northern fleet has moved into Chesapeake Bay to share that catch.

Industry leaders met this past August with representatives of the U. S. Bureau of Commercial Fisheries to review the situation and determine what action should be taken. Information presented by the Bureau showed that no outstandingly successful spawning of menhaden has occurred since 1958. The very large groups of fish born in 1958 has been the main support of the fishery since 1959, but those fish have virtually disappeared through the effects of fishing and natural die-off. Bureau scientists also have discovered that the Chesapeake Bay and New Jersey fisheries are harvesting the same population of

fish. These menhaden are first taken in the Chesapeake region and move to northern waters as they increase in age, which means the Chesapeake fishery has the advantage of harvesting those fish before they migrate to New Jersey and New England.

Since 1956, the proportion of the total catch taken in the Chesapeake area has increased from 33 to 74 percent. Thus, the declining New Jersey menhaden catch is caused by a combination of temporarily reduced spawning success and increased fishing pressure in the Chesapeake region. The trend is expected to continue and the northern fishery is not likely to improve unless fishing effort in the Chesapeake is reduced substantially. This is a difficult problem to resolve and it can be resolved only by the industry itself, but with all the assistance possible by the Bureau to help bring that industry to a better and more equitable economic level.

* * * * *

U.S. FISH OIL PRODUCTION FORECAST FOR 1964:

U.S. production of fish oil (including whale and seal oil, but excluding fish-liver oil) is forecast at 200.0 million pounds in 1964. That would be a gain of about 7.6 percent over the 185.8 million pounds produced in 1963. (Fats and Oils Situation, August 1964, U.S. Department of Agriculture.)

Editor's Note: In January-July 1964, U.S. fish oil production totaled 106.7 million pounds, an increase of 8.2 over the 98.6 million pounds produced in the same period of 1963.

Inventions

SHRIMP HEAD AND VEIN REMOVING TOOL PATENTED:

The inventor of a design for a hand-operated tool to remove the head and pull out the sand vein of shrimp in one operation claims a cleaner, more sanitary, and efficient way of heading shrimp. The inventor states that the tool should be constructed entirely of noncorrosive material, preferably stainless steel, but plastics could be used for handles. The tool has been tested. (Patent No. 3,126,576 SIC 3461; granted Bjarne Johannesen, 3349 Drexel Avenue, Port Arthur, Tex.)

Louisiana

FISHERY LANDINGS, 1963:

Summary: The total commercial catch of fish and shellfish landed in Louisiana in 1963 was down 2 percent in quantity, but up 16 percent in value from the previous year. Important gains in the shrimp catch were responsible for the overall increase in value. Menhaden, shrimp, and oysters accounted for 95 percent of the total Louisiana catch in 1963.

Fig. 1 - Southern marine districts are important producers of fish and shellfish.

Shrimp: Louisiana shrimp landings in 1963 were the highest in 10 years and represented 40 percent of the combined shrimp landings from all Gulf States in 1963.

During the winter months of 1963, unfavorable weather conditions were more prevalent than usual. Severe cold fronts repreatedly lashed Louisiana coastal areas. Despite the bad weather, fairly good shrimp catches were landed in the winter of 1963. During that period, there was evidence of a populous small white shrimp crop in areas west of the Mississippi River. The protection given that crop by a closed season was probably responsible for the record May 1963 catch of over 1.0 million pounds of white shrimp.

Fig. 2 - Medium shrimp trawler docked at Westwego, La.

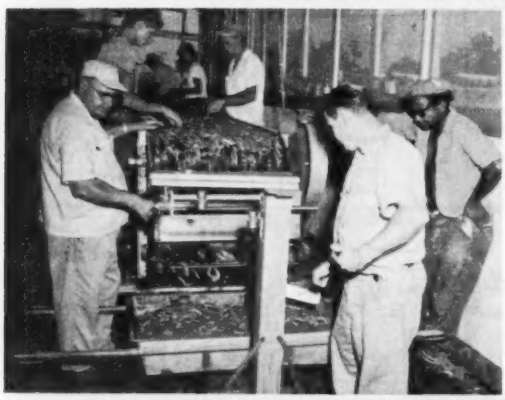


Fig. 3 - Prior to weighing shrimp unloaded from a fishing vessel at Westwego, La., unsuitable shrimp and marine debris are removed from inspection belt prior to weighing. On the scale is a tared weighing bucket.

The Louisiana Wild Life and Fisheries Commission established May 15, 1963, as the opening date for shrimp trawling in the inside waters. A "bumper crop" of brown shrimp had been predicted in the inside waters, and at the opening of the season, brown shrimp were abundant in all areas. The greatest concentrations were found west of the Mississippi River. Landings were so great for several days that the supply exceeded the processing capacity of the canners. Catches leveled off by early June, but continued at an exceptionally good pace until the season closed July 15, 1963.

The fall white shrimp season opened on August 19, 1963, and was even more productive than the spring brown shrimp season. Craft of all sizes, including numerous outboard motor rigs, participated in the harvest. Extremely good catches continued through November. October was the peak production month with white shrimp landings of 10.3 million pounds (heads-off weight).

Canning plants operated at peak capacity during the 1963 shrimp season and shore employment was at a high level. The canners packed nearly 717,000 standard cases--the largest shrimp pack since 1953.

Shrimp prices declined sharply in 1963. In May 1963, ex-vessel prices for small brown shrimp (68 and over count, heads-off weight) averaged approximately $24.50 per 210-pound barrel (heads-on weight) as compared with $49.00 per barrel for the same size-count in May 1962. Prices for large shrimp (15-20 count, heads-off weight) held fairly steady until August 1963.

Oysters: The Louisiana oyster harvest in 1963 yielded 11.6 million pounds of meats valued at $3.7 million. That was the highest catch recorded since 1939 when 13.6 million pounds were reported. Canning plants received the majority of the landings and packed approximately 173,000 standard cases of oysters. The canned pack yield of the 1963 oyster landings was less than expected. There was an unusual tenderness in the texture of the meats during the spring season. That made mechanical shucking difficult and resulted in an abnormal percentage of the meats being broken during processing.

The fresh oyster trade was fairly active in 1963. Large quantities of shell-stock oysters were trucked to processors in other states.

Crabs: Louisiana hard blue crab landings in 1963 of 8.0 million pounds (down 16 percent from the previous year) were the lowest since 1954. There was less effort expended in the crab fishery in 1963 because a number of fishermen shifted to the more profitable shrimp fishery. Crab plants produced approximately 570,000 pounds of fresh-picked crab meat with a wholesale value of $672,000. The demand for fresh-picked crab meat was good throughout most of the year and resulted in fairly stable prices.

Louisiana Fishery Landings, 1962-1963

Species	1963		1962	
	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
Shellfish:				
Shrimp (heads-on):				
Salt-water	80,797.4	19,786.8	43,583.7	14,985.0
Fresh-water	16.6	3.9	1.6	0.2
Oysters (market)	11,563.2	3,720.1	10,159.7	3,316.4
Crabs, blue:				
Hard	7,981.9	447.1	9,522.9	462.5
Soft and peeler	328.7	164.4	343.9	171.9
Crawfish, fresh-water	2,118.4	300.1	3,097.1	408.2
Other shellfish	253.4	132.3	278.3	122.6
Total shellfish	103,059.6	24,554.7	66,987.2	19,466.8
Salt-water Fish:				
Edible fish	2,535.9	358.9	3,017.8	424.3
Menhaden	633,484.3	7,861.9	689,157.4	7,994.2
Unclassified fish for bait, reduction, and animal food	6,970.8	87.4	2,200.0	27.5
Total salt-water fish	642,991.0	8,308.2	694,375.2	8,446.0
Fresh-water Fish:				
Catfish and bullheads	8,665.3	1,766.6	8,826.3	1,800.5
Buffalofish	3,487.6	398.7	3,546.2	419.5
Other fresh-water fish	2,458.7	167.1	2,885.4	200.9
Total fresh-water fish	14,611.6	2,332.4	15,257.9	2,420.9
Total Louisiana landings	760,662.2	35,195.3	776,620.3	30,333.7

Note: Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight.

Fig. 4 - Menhaden vessel docked at a fishery industrial products plant in Empire, La.

Menhaden: Landings of 633.5 million pounds of menhaden in 1963--representing the second largest Louisiana catch in the history of the fishery--were 8 percent below the record catch in 1962. Considerable fishing time was lost in 1963 due to unfavorable weather on the menhaden grounds. The 1963 Louisiana menhaden catch yielded 66,200 tons of meal, 7.9 million gallons of oil, and 5.0 million gallons of solubles. Those industrial products had a combined value of $13.1 million. The oil market was sluggish in the beginning of 1963 with large stocks carried over from the previous season, but market conditions improved in the summer and continued an upward trend during the remainder of the year.

Edible Finfish: Louisiana landings of finfish for human consumption in 1963 amounted to 17.1 million pounds valued at $2.7 million. Fresh-water species, as usual, accounted for the bulk of the catch. All of the leading fresh-water species registered slight declines in 1963. The market weakened in the spring months and prices to the fishermen were reduced.

Recurrent fish kills in the Mississippi River have aroused much concern. Massive fish kills were reported for the fourth successive year in areas extending from above Baton Rouge to the mouth of the River. Similar kills occurred in the Atchafalaya River, Bayou Grand Caillou, and Bayou Black. Investigations conducted by the Louisiana Wild Life and Fisheries Commission's Water Pollution Control Division indicated that pesticides may have caused the fish kills. In some cases, pollution from industrial operations was believed to have contributed to the fish losses.

Miscellaneous: Louisiana reports a sizable production of fresh-water crawfish. An in-

creasing number of crawfish farms provide a reliable supply for the growing market for that item.

New York City

RELOCATION OF WHOLESALE FULTON FISH MARKET RECOMMENDED:

Comprehensive studies on the relocation of the New York City Wholesale Fulton Fish Market were completed this past summer by that city's Department of Markets. A report on the studies calls for a new wholesale fish market at a cost of about $14.5 million to be located at Hunts Point, Bronx, on a site proposed as an expanded New York City Terminal Market which will also include a produce terminal and a meat distribution center.

The Mayor's Market Advisory Committee at New York City, after studying the Consultant's report on the Wholesale Fulton Fish Market, unanimoulsy approved the project stating that the interests of New York City, as a whole, would be served by the relocation of the existing Wholesale Fulton Fish Market from its present location to new facilities to be constructed by the city on a site large enough to consolidate, but not necessarily limit the markets involved.

The Consultant's report stated that "the Fulton Fish Market has been operating continuously at its present location on the East River, at the foot of Fulton Street for more than 140 years. Housed for the most part in old rundown buildings, there are now more than 90 dealers, wholesalers of fresh and frozen finfish and shellfish, processors and purveyors, located in the market area."

Fig. 2 - A scene in the Fulton Fish Market area, New York City, showing the present congested conditions.

The Consultant's report brought out (1) the importance of fishery products receipts at the Wholesale Fulton Fish Market, (2) the importance of vessel fishery landings at New York City, and (3) that the annual per capita consumption of fishery products at New York City is relatively high--about 30 pounds per capita, or about three times more than the national per capita consumption.

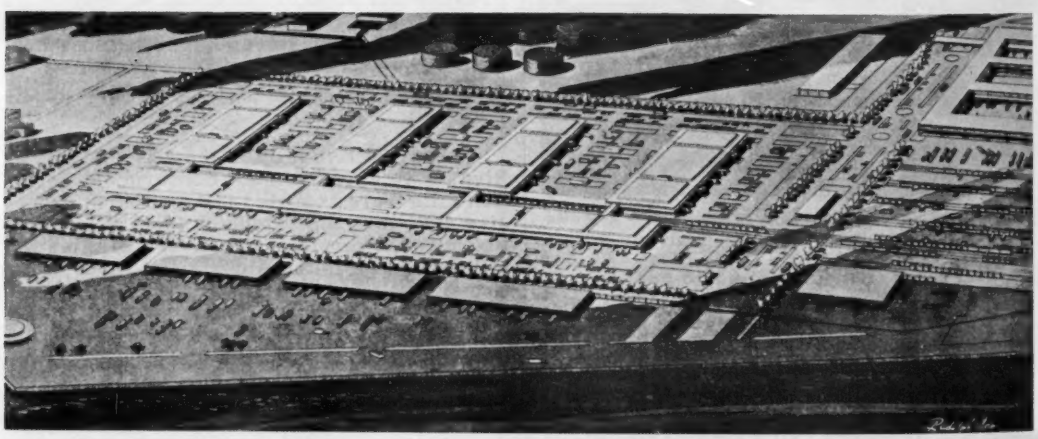


Fig. 1 - Proposed expanded New York City Terminal Market at Hunts Point, Bronx. At the right, is the produce terminal now under construction, with some of its buildings and the railroad team track area shown; in the middle, are the large buildings comprising a proposed meat distribution center, and at the lower left, in the shaded area is a suggested wholesale fish market.

Fig. 3 - A scene inside one of the Fulton Fish Market sheds.

In 1963, total receipts at New York City of fresh and frozen fishery products of both salt-water and fresh-water varieties amounted to 183 million pounds. In addition, 40 draggers in 1963 landed 335 trips at Fulton Fish Market piers with about 8 million pounds of fresh fish and shellfish, including scup (porgy) and sea scallop meats as the principal species.

In describing existing conditions at the Wholesale Fulton Fish Market, the Consultant's report concluded with, "Located astride South Street, a major north-south artery with thousands of vehicle movements daily, it is difficult for buyers to come and go freely. The rundown, unsanitary and inadequate market buildings are hardly attractive to discriminating buyers and certainly do not stimulate increased sales. Furthermore, our studies indicate that little, if anything, can be done to improve conditions at this location. It is in the best interests of the City and market users to relocate rather than rehabilitate."

North Atlantic Fisheries Exploration and Gear Research

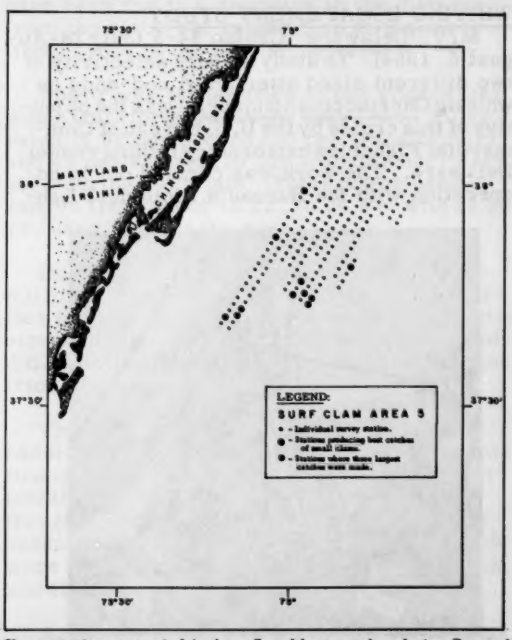
SURF CLAM SURVEY CONTINUED:

A survey of surf clam resources in certain waters off Maryland and Virginia was conducted in June and July 1964 by the U. S. Bureau of Commercial Fisheries research vessel Rorqual. The vessel was continuing an Atlantic surf clam survey begun in the summer of 1963. Survey work in 1963 was conducted in various areas extending from the south shore of Long Island, N. Y., to Maryland.

During June and July 1964, the Rorqual operated in waters off the Maryland and Virginia coasts (see chart). Working in the northern section of that area and following predetermined 1-mile grid lines, the vessel occupied 231 sampling stations. A 5-minute tow with a commercial (40-inch blade) jet dredge was made at each station.

Surf clams were taken in all but 2 of the 231 tows. The catch ranged up to 766 clams per tow (about ten 80-pound bushels). The size of the clams ranged from 0.75 to 7.25 inches in length, with most of them falling in the 5.75- to 6.50-inch size group. Considerable variation was noted both in the number of clams per tow and in the size composition. The 3 largest catches consisted of 184, 198, and 766 clams, having weights of 225, 242, and 781 pounds, respectively.

The surf clam is by far the predominant clam in the waters surveyed in Area 5. There are indications that the density of surf clams



Shows stations occupied in Area 5 and best catches during Rorqual surf clam survey in June-July 1964.

may increase as the survey extends to the south and east. The 3 best catches were made during the last 2 weeks of operation, while working in the more southern section of the survey area.

Surf clams were found to be most abundant in waters where the depths ran between 80 and 110 feet. The largest catch was made at a depth of 102 feet, with other good catches occurring in waters of about the same depth. No notably good catches were made in waters that were less than 80 feet deep, where the bottom was found to be generally much harder.

While running between stations, a clam sounder was usually kept in operation on the bottom. The instrument indicated that surf clams are distributed very extensively at varying densities in the sections between stations and that the species is very well established in the area surveyed.

The Rorqual was scheduled to resume the Atlantic surf clam survey in the fall of 1964.

Note: See Commercial Fisheries Review, November 1963 p. 28.

* * * * *

WHITING ESCAPEMENT STUDY:

M/V "Delaware" Cruise 64-5 (July 28-August 6, 1964): To study the size selectivity of two different sized otter trawl cod-ends on whiting (Merluccius bilinearis) was the objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. The work was carried out in cooperation with the Bureau's Biological Laboratory, Woods Hole, Mass., as part of the studies of the International Commission for the Northwest Atlantic Fisheries.

During this cruise, vessel operations were carried out for the largest part of the time in areas where the commercial whiting fleet was trawling--off Cape Cod from Nauset Buoy to Chatham and in Cape Cod Bay. In addition, the vessel spent one day on Georges Bank southwest of Cultivator Shoals.

On this cruise, a 2-inch and a 3-inch mesh internal stretched mesh cod-end were interchanged on a nylon 60-80 whiting net rigged on the vessel's starboard side and a cotton net of the same design rigged on the port side. In addition, a 1-inch mesh nylon cover was affixed to the top of the 2-inch cod-end during a number of tows of the series.

Trawling was done in random sequences, changing the cod-ends and changing from port and starboard sides of the vessel after every 5 tows. A total of 60 tows was made in which sufficient whiting were taken to give valid information. Each tow lasted from 30 minutes up to one hour.

All fish caught on this cruise were counted and measured for length-frequency data, or where catches of a single species were large, a two-bushel subsample was measured. The fish escaping into the cover on the 2-inch cod-end were measured and recorded separately. Internal mesh measurements of the cod-ends and cover were taken at regular interval using an I. C. E. S. (International Council for Exploration of the Seas) mesh gauge.

Fig. 1 - 1-inch cover (A) over 2-inch cod-end (B).

Fig. 2 - Measuring mesh size with mesh gauge.

Data collected on this cruise has been turned over to the Bureau's Biological Laboratories for computer analysis and interpretation. Depending upon results, further studies may be continued aboard commercial fishing craft.

* * * * *

ELECTRICAL FISHING TESTS CONTINUED:

M/V "Delaware" Cruise 64-6 (August 17-28, 1964): Underwater observations were made of the action of fish in or near the effective range of an electric field by means of closed circuit underwater television during this 12-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware.

Observations during the cruise of fish actions and reactions to the net, without the electric field, are summarized as:

1. The fish do not seem to be panicked or even particularly frightened by a net.

2. At slow towing speeds, the fish swim along (a) in front of the net, (b) within the mouth of the net, or (c) into and out of the net.

3. At higher towing speeds, the fish swim along with the net, but at an increased rate; as towing continued at higher speeds, the fish swim more in the direction in which the net is towing and with less laterial movement. At accelerated swimming rates, the fish tend to drop back into the net with increased frequency as they become tired. Upon occasions, however, they increase their swimming rate in spurts in order to swim out of the net or its path. From time-to-time, fish could be observed going under or between the rollers at the higher towing speeds.

When the electric field was in use, the observed reaction of the fish to the field, in general, were as follows:

1. When within the effective range of the field, the fish were (a) quickly seized by muscular spasms which made swimming behavior ineffective; (b) the spasms were immediately followed by temporary paralysis; (c) if the field was quickly turned off, the fish could recover their swimming ability and escape before they went into the net; (d) if the field was kept on, deep stunning (narcosis) or death followed.

2. When captured by the field, the fish nearly always assumed a position above the bottom, nearly perpendicular to the bottom, with their heads in an upward position and with their belly forward and away from the net.

3. In this stunned and floating position, the fish were overtaken and scooped up by the net.

4. Although the smaller fish usually swam higher off the bottom (when distributed by the net) than the larger fish, they were affected by the field at approximately the same distance from the anode; the strength of the field in front of the anode (where the larger fish were affected) was probably not as great as it was where the smaller fish were taken (the latter were nearer to a vertical position above the anode).

5. At the leading edge of the effective field, the fish were less affected while swimming directly away from the anode than when they attempted lateral movement; this may have been due to a decrease in the distance from the electrode rather than to the directional force of the electrical field.

Power was transmitted to two underwater pulse transformers on the trawl net. Pulse rates of 60 per second (30 per transformer) and 40 per second (20 per transformer) were used during the trials. Total power used ranged from about 18 kw. to 34 kw. with 26.25 kw. used most of the time.

During the cruise, some 4,000 feet of 16 millimeter movie film was exposed in an effort to obtain a permanent record of activities viewed by the underwater TV camera. In addition, a limited footage was taken of the electrical equipment in use.

The species of fish observed included: haddock, cod, halibut, wolffish, dogfish, skate, flounder and sole, and a number of other unidentified fish. The unidentified fish were thought to include either herring or bluebacks and whiting or hake. The film records were made mostly on dogfish, small haddock, and flounder and sole.

Areas (1) in Cape Cod Bay, (2) off of Nausett Beach, (3) at the Southeast Part of Georges

Bank, (4) at the Bight of Clarks on Georges, (5) on Stellwagen Bank, and (6) in Ipswich Bay, were utilized during the cruise in search of unclouded water. Depths ranging from 6 to 32 fathoms were fished in the effort to find fish, good bottom, sufficient light and clear water, all of which were required for making good films.

Artificial illumination was used at times with little if any effect on the fish; neither a scare effect nor an appreciable attraction to the light was apparent.

The maximum limits of visibility encountered during the cruise were about 20 feet near the surface and 12 to 14 feet at the bottom in front of the net being towed.

Note: See Commercial Fisheries Review, September 1964 p. 30; June 1964 p. 20; January 1964 p. 21.

North Atlantic Fisheries Investigations

SUMMER DISTRIBUTION AND ABUNDANCE OF GROUNDFISH SPECIES STUDIED:

M/V "Albatross IV" Cruise 64-10 (Part I July 27-August 11; Part II August 6-22, 1964): To determine the summer distribution and relative abundance of groundfish species from

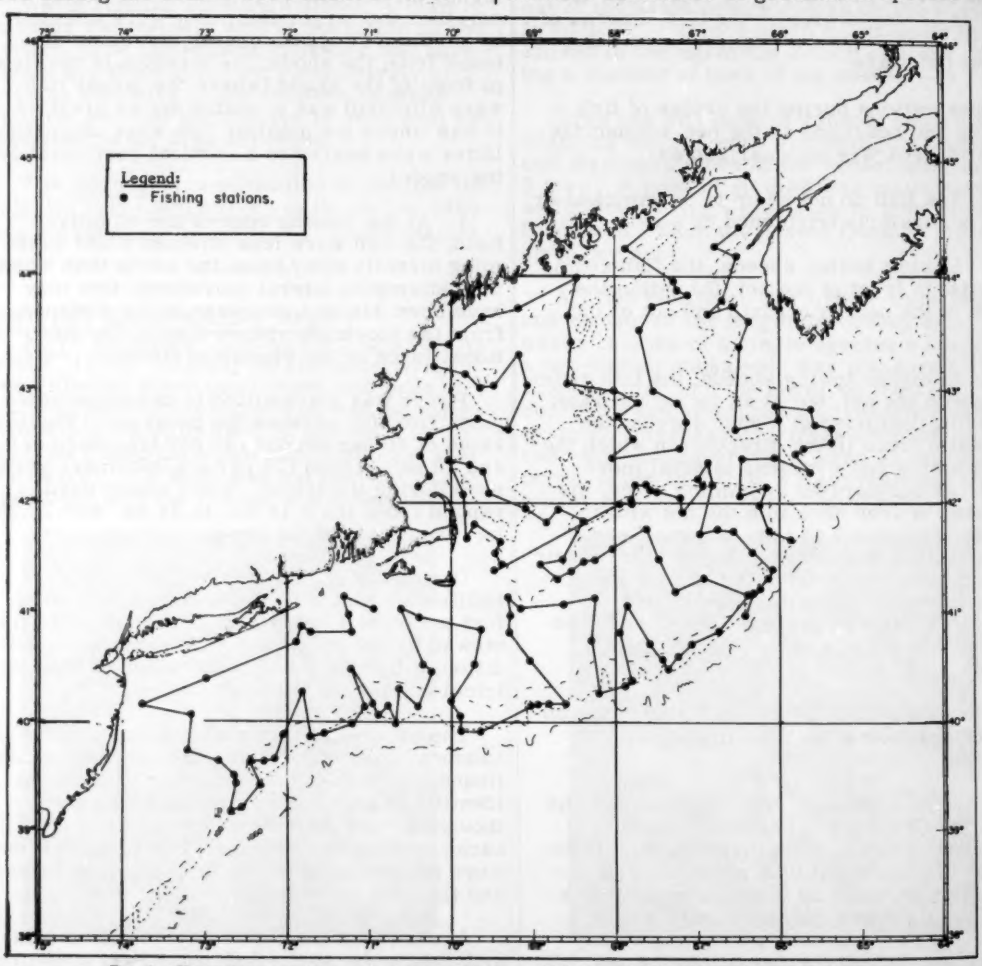


Fig. 1 - Shows fishing stations worked during Albatross IV Cruise 64-10, July 27-August 22, 1964.

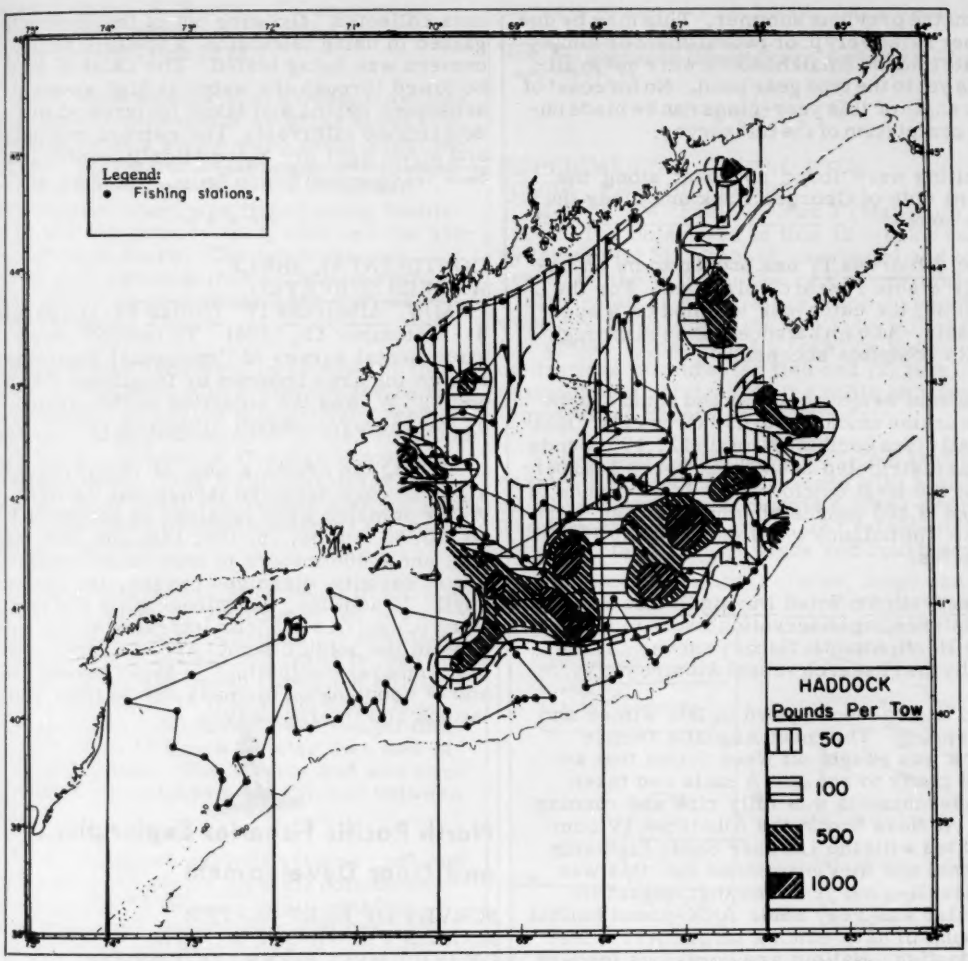


Fig. 2 - Shows amount of haddock taken per tow during Albatross IV Cruise 64-10, July 27-August 22, 1964.

the Bay of Fundy southward to Hudson Canyon was the purpose of this survey by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

A total of 180 groundfish survey stations were made on this cruise. All fish were identified and measured, and the total weight by species was obtained from each tow. Stomach contents of 1,781 fish were examined and recorded from 41 species caught throughout the study area. Scale samples were taken from 1,262 haddock and 539 yellowtail flounders. Otoliths were extracted from 380 whiting (silver hake) and 179 butterfish. Also, a sample of sea herring was collected and frozen for the Bureau's Biological Laboratory at Boothbay Harbor, Maine. Samples of red and white hake were frozen for further studies on the life history of those species.

Large quantities of small haddock between 15-30 centimeters (6 to 12 inches) long were caught on Georges Bank in depths between 30 to 50 fathoms. Those were one-plus year old fish originally reported after the 1963 summer and fall groundfish survey Albatross IV (Cruise 63-5). Catches of this year's (1964) year-class of haddock were low. They were absent from some areas where they were a-

bundant the previous summer. This may be due to either relatively poor recruitment or simply indicate that the small haddock were not available as yet to the type gear used. No forecast of the strength of this year-class can be made until the completion of the fall survey.

Whiting were found abundant along the western side of Georges Bank and along the Maine coast.

The Albatross IV has proven to be an unusually stable research platform. For the first time, the catch was weighed on a species basis. A beam balance was used throughout with complete success.

The total weight of all fish and squid caught on this cruise amounted to 49,000 pounds. Haddock (all sizes combined) totaled 21,100 pounds and was distributed as shown in figure 2 (43 percent of the total catch), while 3,500 pounds of cod and 3,200 pounds of spiny dogfish were caught. The balance was divided among 46 other species.

Observations Noted During Cruise 64-10: Some interesting observations were made during the North Atlantic fishery survey Cruise 64-10 by the research vessel Albatross IV.

Cod and haddock spawn in late winter and early spring. This past August a female haddock was caught off Nova Scotia that appeared ready to spawn. A male cod taken off Massachusetts was fully ripe and running. While off Nova Scotia the Albatross IV communicated with the Lurcher Shoal Lightship personnel and they mentioned that this was an unusually cold year and that August in particular was very cold. A 64-pound halibut was found to have eaten a large (over 2 feet long) dogfish. Halibut are voracious feeders, frequently eating big lobsters and large crabs, but the dogfish was a surprise. As anticipated, yearling haddock were unusually abundant. The incoming year-class of haddock was not in evidence during August and any prediction of its strength can not be made until completion of the fall survey cruise. Young haddock are not necessarily on the bottom in August.

Surveying marine fish abundance with the otter trawl is as yet the only feasible technique. The Bureau's Woods Hole Biological Laboratory is continually investigating other techniques in an effort both to increase survey efficiency and to improve the quality of data collected. Growing out of the experience gained in using television, a towable still camera was being tested. The camera may be towed through the water at high speed at scheduled depths and takes pictures at predetermined intervals. The camera mechanism and strob light are automatically controlled.

Note: See Commercial Fisheries Review, Sept. 1963 p. 37.

* * * * *

CONTINENTAL SHELF WATERS SURVEYED:

M/V "Albatross IV" Cruise 64-11 (August 31-September 13, 1964): To conduct an environmental survey of Continental Shelf waters in the area bounded by longitudes 64° W. and 72° W. was the objective of this cruise by the research vessel Albatross IV.

During the cruise a total of 74 hydrographic stations were occupied throughout the area. Water samples were obtained at depths of 1, 10, 20, 30, 40, 50, 75, 100, 150, 200, 300, 500, 750, and 1,000 meters to determine temperature, salinity, dissolved oxygen, and chlorophyll. In addition, 24 hydrographic stations were occupied at 2-hour intervals at a moored buoy in the South Channel area to determine the temporal fluctuations of those properties, and of zooplankton biomass due to tidal oscillations and internal waves.

North Pacific Fisheries Explorations and Gear Development

SURVEY OF DEEP-WATER MARINE FAUNA OFF MOUTH OF COLUMBIA RIVER CONTINUED:

M/V "Commando" Cruise 11 (August 31-September 17, 1964): The objectives of this cruise on a predetermined trackline southwest of the Columbia River were to: (1) compare the sampling efficiency for demersal fauna of a 70-foot semiballoon shrimp trawl and a 400-mesh eastern otter trawl, (2) collect faunal samples for the U. S. Bureau of Commercial Fisheries Technological Laboratory at Seattle, Wash., and for radiological analysis by the Laboratory of Radiation Biology, University of Washington, and (3) take cores of the substrate for heteroptrophic marine bacteria studies.

This cruise by the exploratory fishing vessel Commando was the 15th in a series con-

ducted by the U. S. Bureau of Commercial Fisheries in cooperation with the Atomic Energy Commission (AEC).

The 70-foot semiballoon shrimp trawl was fished with V-type doors weighing about 850 pounds each on a single warp using 25-fathom bridles. Four 8-inch aluminum trawl floats were attached to the headrope. The 400-mesh eastern trawl was fished using double warps with 50-fathom dandylines and the 850-pound V-type doors. The headrope was buoyed with eleven 8-inch aluminum trawl floats, and a $1\frac{1}{2}$-inch mesh liner was placed in the cod end.

Fishing was conducted in 50 and 100 fathoms in accordance with a randomized sampling design. A total of 8 half-hour tows was made with each gear in each of the two depths making a grand total of 32 drags throughout the experiment. Five additional drags were made at the 50- and 400-fathom stations with the shrimp trawl to obtain samples for radiological analysis.

Marked differences were found in the fish and shrimp-catching abilities of the two different types of gear. Although the effective width opening of the shrimp trawl is less than that of the 400-mesh trawl, the shrimp trawl caught 10 to 15 times more shrimp. Conversely, the 400-mesh trawl caught fish at a rate 10 to 15 times greater than that of the shrimp trawl. The species and size composition of the catches also differed between gear.

Hake, immature sablefish (black cod), and pink shrimp (Pandalus jordani) dominated the catches in 50 fathoms while rockfish (Sebastodes sp.), Dover sole, and rex sole were the most common forms in 100 fathoms. Eight tagged Dover sole (5 in 50 fathoms and 3 in 100 fathoms), which had been tagged and released on the trackline by personnel of the Oregon Fish Commission on previous cooperative Bureau-AEC cruises, were recovered.

Samples of fish and invertebrates were collected and frozen for the Laboratory of Radiation Biology of the University of Washington. Additional samples were collected for the Bureau's Technological Laboratory in Seattle.

A total of 10 cores was taken at 50, 300, and 850 fathoms for heterotrophic marine bacteria studies by personnel from the College of Fisheries, University of Washington.

Note: See Commercial Fisheries Review, April 1964 p. 25; January 1964 p. 23.

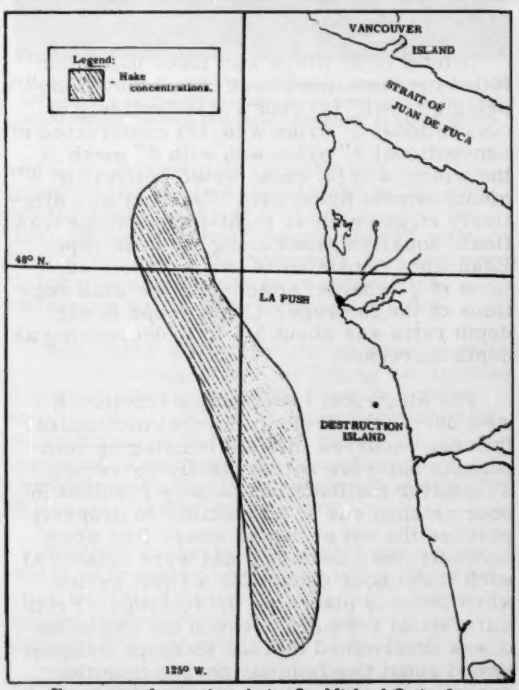
* * * * *

EXPERIMENTAL FISHING WITH "COBB" PELAGIC TRAWL:

M/V "St. Michael" Cruise 2 (May-July 1964): The objectives of this 12-week cruise by the vessel St. Michael, chartered and operated by the U. S. Bureau of Commercial Fisheries as an exploratory fishing vessel, were to: (1) evaluate the commercial potential of the "Cobb" pelagic trawl on known concentrations of midwater fish and (2) test heavy-duty electrical towing cable and depth-temperature recording instruments.

The vessel St. Michael, a 72-foot trawler, carries a crew of 4, is powered with a 353 hp. Diesel engine and mounts a trawl-net reel. The reel facilitates setting and retrieving the net, especially in high winds and rough seas.

On this experimental cruise, large concentrations of hake were found off the Wash-



Shows area of operations during St. Michael Cruise 2.

ington coast between Destruction Island and the Umatilla light-ship. Hake schools, as defined by a high sensitivity white-line echo-sounder, were located from the bottom up to 20 fathoms above the bottom.

Following initial good catches of hake off Washington, the net was fished on commercial fishing grounds in Queen Charlotte Sound off British Columbia, in an attempt to produce large quantities of Pacific ocean perch. Ocean perch catches, however, did not exceed 6,000 pounds an hour. One two-week period was devoted to operations during hours of darkness. Extensive soundings were taken during that period without locating off-bottom fish schools. Poor weather hampered each phase of the cruise and reduced time available for night fishing.

In the later part of the cruise, testing of the gear on known hake concentrations was resumed off Washington where numerous large hake catches were made. The largest single catch was 50,000 pounds in 90 minutes; the highest catch rate was 30,000 pounds taken in 30 minutes of fishing time. Catches in excess of 15,000 pounds in 30 minutes were common.

A total of 56 drags was made using the following three modifications of the "Cobb" pelagic trawl: (1) constructed entirely of conventional 3" nylon web, (2) constructed of conventional 3" nylon web with 6" mesh in the wings, and (3) constructed entirely of 3" monofilament nylon web. Each net was similarly rigged with 41 eight-inch Phillips trawl floats equally spaced along the head rope. Lead lines consisted of two 5-fathom sections of $\frac{3}{8}$" chains, attached to the wind sections of the footrope. Cable scope to net depth ratio was about 3.5 to 1, decreasing as depth increased.

The electrical trawl cables functioned well during the cruise. Several mechanical failures occurred in the telemetering components but were satisfactorily corrected. Telemeter malfunctions usually resulted in poor catches due to an inability to properly position the net at depths where fish were concentrated. Sensing units were located at each trawl door except for a short period when one was placed on the footrope. From differential readings between the two units it was determined that the footrope was positioned about two fathoms deeper than the doors. Also, the net appeared to bank much like an airplane when the vessel turned. Underwater observations made of the nets prior to the cruise indicated the net opening to be about 60 feet square.

Overall results of the cruise were encouraging and all major components operated as designed. Minor additional changes should make the gear suitable for commercial fishing.

Oceanography

LARVAL SPECIMENS OF TUNA, SWORDFISH, AND MARLIN COLLECTED IN THE TROPICAL ATLANTIC:

The collection of larval forms of large pelagic fish was a primary objective of a 21-day cruise (July 24-August 14, 1964) to Bermuda, the Sargasso Sea, and the northeastern Bahamas by the research vessel John Elliott Pillsbury (owned and operated by the Institute of Marine Science, University of Miami). The cruise was sponsored by the National Science Foundation.

Hundreds of larval tuna were taken during the cruise to form one of the most extensive collections of young tuna ever assembled. Other larval specimens taken included white marlin and blue marlin about $\frac{1}{8}$-inch in length, broadbill swordfish as small as $\frac{1}{4}$-inch in length, and many dolphin, barracuda, and gaint ocean sunfish. The tiny marine specimens will help scientists trace the life his-

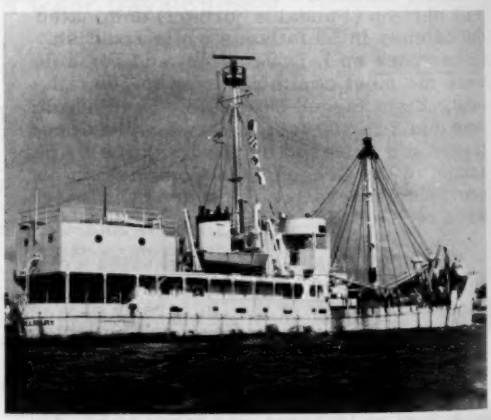


Fig. 1 - Research vessel John Elliott Pillsbury departs on an oceanographic cruise to the Tropical Atlantic.

Fig. 2 - Working deck of the research vessel John Elliott Pillsbury.

tories, migration patterns, and spawning locations of large pelagic fish.

Plankton collections during the cruise indicate that the major spawning grounds of marlin are located southwest of Bermuda and in the northeast and northwest Bahamas, according to the scientist who directed sampling work aboard the Pillsbury.

In addition to the collection of larval fish, general sampling was carried out with midwater trawls, bottom trawls, and bottom dredges from depths of 3,000 to 6,000 feet. Wire cable up to four miles in length was required on some of the deep-water hauls. Night-light fishing techniques were used to capture lanternfish, dolphin, flyingfish, squid, octopus, and other marine animals.

One interesting catch was a perfectly formed sailfish only $1\frac{1}{2}$ inches long taken in a midwater trawl, and it came aboard alive

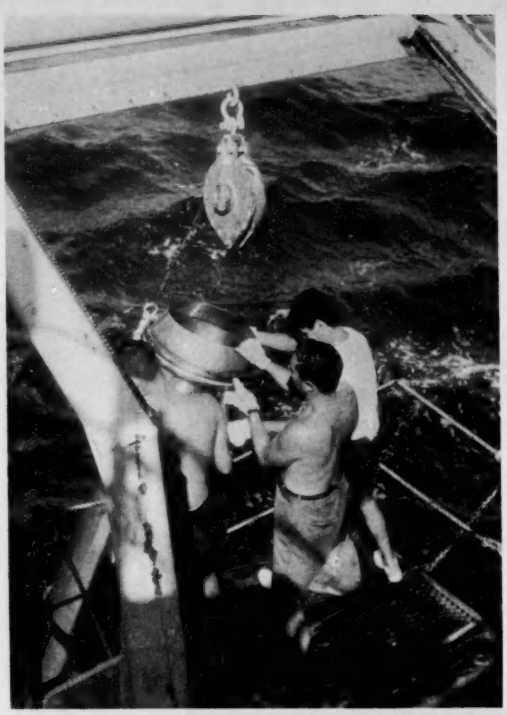


Fig. 3 - Putting over a high-speed plankton sampler which can be towed at 8 knots, thereby capturing fast-swimming organisms that avoid regular plankton nets (which are towed at slower speed).

and in good condition. Placed immediately in one of the aquaria maintained on the vessel for photography of live specimens, the little fish swam about vigorously for more than an hour with its miniature sail held erect. Color motion pictures were made of the swimming sailfish for behavior studies.

Many deep-water specimens were captured alive and photographed, including the unusual Argonaut, the octopod that lives in a paper nautilus shell. While being photographed in an aquarium, one Argonaut gave birth to hundreds of microscopic baby Argonauts, complete with pearly, transparent shells less than a millimeter in diameter.

Another unusual catch during the cruise was a deep-water anglerfish which came up alive with its fragile "fishing lure" intact. Before it died, movies were made of the strange fish swimming in an aquarium.

The Pillsbury left Miami on July 24, 1964, and began its scientific collecting on the east-

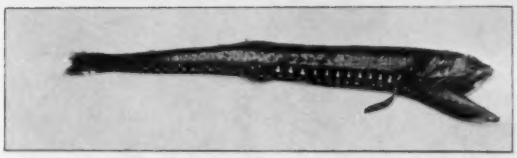


Fig. 4 - Shows an unusual specimen (a Gonostomatid) collected by the research vessel John Elliott Pillsbury. This deep-water fish, only a few inches in length, was captured at a depth of about 4,000 feet. Note the light organs along the underside of the fish.

ern edge of the Gulf Stream near Grand Bahama Island. Then the vessel worked its way north to a point off Charleston, S. C., where she swung east to Bermuda. After two days of inshore and coral reef collecting at Bermuda, the vessel proceeded northeast to a large seamount. Activities were curtailed, however, by gale winds so the Pillsbury moved south to calmer waters. After working off Abaco and around the northern edge of the Little Bahama Bank, the research vessel returned to Miami, Fla., on August 14, 1964.

The Pillsbury left Miami again on August 20, 1964, for an oceanographic cruise to the Caribbean. (Institute of Marine Science, University of Miami, August 19, 1964.)

* * * * *

EXCHANGE VISITS BY UNITED STATES AND SOVIET OCEANOGRAPHERS:

Six United States oceanographers began a 4-week tour of the Soviet Union on September 14, 1964, as part of an exchange program that will bring a similar delegation of Soviet oceanographers to the United States. This will be the first exchange of oceanographers between the two countries.

The schedule of the United States group called for them to visit 13 Soviet oceanographic installations as well as the Soviet oceanographic vessel Mikhial Lomonosov. Individual visits to an oceanographic submarine, a geochemistry institution, and the Soviet Naval Hydrographic Office were also planned. The tour will take the United States oceanographic delegation to Moscow, Yalta, Gelendzhik, Sevastopol, Leningrad, and Murmansk.

The exchange visits by United States and Soviet oceanographers are sponsored by the Coast and Geodetic Survey, U. S. Department of Commerce.

* * * * *

SMALL PORTABLE MARINE WORK PLATFORM WITH DERRICK:

A small marine work platform known as the "Hydro-Cat" has been developed by a firm in California. According to its designers, the 18-foot craft with a $10\frac{1}{2}$-foot beam is intended to serve as a stable work platform specifically for use by oceanographers and limnologists.

Fig. 1 - Shows Hydro-Cat under construction.

Figs. 2 - Shows completed Hydro-Cat in the water.

Its features include a center-located demountable derrick and instrument hatch for convenient lowering of instruments; ballast tanks for rough-weather work; and forepeak and afterpeak collision bulkheads. It can be powered by any outboard motor from 25 to 100 horsepower. The "Hydro-Cat" can be quickly broken down to two hulls and a center section to facilitate transport.

Oregon

METOLIUS SALMON HATCHERY CLOSES AND EXPERIMENTAL HATCHERY STATION OPENS:

The closure on July 31, 1964, of the Metolius River Salmon Hatchery above Pelton Dam was announced by the Oregon Fish Commission in early August 1964. At the same time the Commission announced plans to open a test hatchery unit below Pelton Dam by September 15, 1964.

The Metolius hatchery, located on Spring Creek (a Metolius tributary) some 30 miles above the Pelton-Round Butte dam complex, was established in 1947. Its purpose was to compensate partially for losses of spawning and rearing areas on the Columbia River and tributaries as a result of dam construction.

Factors leading to the closure of the Metolius hatchery were the station's limited facilities, difficulties in passing both upstream and downstream migrant salmon over the Pelton-Round Butte dam complex, and low water temperatures in the area, all of which contributed to the relatively high cost of the fish reared to release size at the hatchery. During earlier phases of the Metolius operation, both sockeye and spring chinook salmon were handled at the station but in later seasons efforts were concentrated on spring chinook.

The closure of the Metolius station, however, does not mean the end of hatchery operations in the area. Plans call for an investigation of the potential for artificial propagation of spring chinook, steelhead, and possible other species at the site of the new test hatchery unit immediately below the re-regulating dam at Pelton. The new experimental operation will consist of hatching spring chinook and steelhead eggs from fish taken either from the Deschutes or from the Willamette River system, and rearing the resultant fingerlings for a full year.

Water to operate the test facility will be taken from the forebay of the re-regulating dam, which offers water suitable in quality and temperature for fish cultural purposes. Water temperatures at the dam range between 40°-60° F. The river flow below the re-regulating dam averages some 3,000 cubic feet per second, which is far above the pilot station's requirements and would be more than adequate for a hatchery with a capacity of 1½ million yearling salmon.

The cost of the small pilot station is reported to be about $10,000 for construction plus an additional $10,000 for equipment and operating expenses during the first year. Expansion of the experimental project to a full-scale production facility, if such course appears feasible, will be much more expensive. A station with a rearing capacity of a million yearling chinook, for example, could be expected to cost $350,000 or more. About half of the money needed for the pilot station is being provided by the electric company which owns the Pelton-Round Butte dam complex.

The Oregon Fish Commission described the closing of the Metolius station and establishment of the pilot hatchery below Pelton Dam as an effort to modernize or replace outmoded facilities. It was pointed out that the Oregon spring chinook hatchery program in the Willamette River system has been highly successful during recent years giving rise to considerable optimism that a successful spring chinook program could be developed on the Deschutes River below the dams.

Oysters

LIGHT STRIKE IN JAMES RIVER SEED BEDS IN 1964:

A light set of oysters in the James River seed area occurred during the first two weeks of September 1964, according to scientists at the Virginia Institute of Marine Science, Gloucester Point, Va. The head of oyster research at the Institute reported that after intensive surveys it is now known that a "light" strike began during the last four days of August and continued with decreasing intensity through September 8.

The Institute scientist said, "The distribution of spatfall this summer was most peculiar. Strings of test shells indicated that spatfall was heaviest on upriver inshore areas. This suggests that the oyster larvae originated from oysters in the seed area rather than from downriver oysters. It is my belief that in normal years most larvae originating in shallow inshore waters are carried downstream and lost."

A check of natural cultch (shell) collected from seed beds in the upper James River was made on September 11. Microscopic examinations of those shells revealed that some spat had collected on all beds from Wreck Shoal to Deep Water Shoal on both sides of the

THE UNIVERSITY OF MICHIGAN LIBRARIES

river, substantiating the observations on test shells put out by the Institute. The scientist emphasized that spat observed on September 11 were very small. Most of those found were about $\frac{1}{25}$th of an inch across and would require a good magnifying glass to be seen readily. He noted that such small spat usually survive very well in the upper river.

Although the 1964 spatfall appears to be quite light in comparison with long-term records from the James River, it will probably be an improvement over the past three years. The upriver location of this spatfall is particularly beneficial because of complete failure there in recent years.

The Institute's oyster research scientist pointed out that quality of cultch often influences the intensity of setting and survival. "We always use clean shells for our weekly test strings in the river," he noted, "But natural cultch varies greatly in quality. The cultch in the upper seed beds this year is fouled with a coat of 'moss animals,' whereas the shells in the middle river beds are cleaner except for some sea squirts. Unfortunately, most of the inshore beds lack cultch and what little is there is badly fouled with sea squirts. The number of spat surviving will be influenced by those factors."

State shell plantings of 1963/64 in the middle of the seed area are reasonably clean of fouling organisms, but are located somewhat downriver from the best of the 1964 spatfall. The location of the State shell plantings was based upon setting records from past years which indicate that normally the best set occurs on the downriver and channelward seed rocks.

From records accumulated over the past 20 years, the scientist indicated that the normal setting season continues until the first of October, but oysters were now spawned out and it was unlikely that much more setting would occur this year. When summer temperatures prevail, free-swimming larvae require a period of 10 to 12 days before setting. The Institute scientist feels that the effect of tropical storms with their high tides is probably harmful to broods of oyster larvae since they are likely to be carried out of the river.

The Director of the Virginia Institute of Marine Science pointed out that this latest information on oyster setting is a direct result of the increased attention being given to James estuary under the Institute's Operation James River which is a study of the physical and biological characteristics of the system. He further said that more careful studies of the setting of oysters and other important larvae are being planned for the 1965 field season.

* * * * *

DEVELOPMENT OF DISEASE-RESISTANT OYSTER STRAINS:

Studies on the development of disease-resistant strains of oysters were recently started at Rutgers University in New Jersey; the Virginia Institute of Marine Science, Gloucester Point, Va; Natural Resources Institute of the University of Maryland, Solomons, Md.; University of Delaware Marine Laboratory, Newark, Del. The studies are part of the program under Public Law 87-580 and are being conducted with funds administered by the U. S. Bureau of Commercial Fisheries to determine the resistance of various oyster stocks to MSX mortality.

The Bureau's Milford (Conn.) Biological Laboratory is cooperating in this program by (1) supplying conditioned oyster spawners of Long Island Sound origin; (2) conditioning Chesapeake Bay oysters for comparative studies and spawning; and (3) rearing larvae of presumed resistant stocks for testing of juvenile oysters to MSX exposure at various mid-Atlantic locations. This also involves sending starter cultures of a number of species of algae to both State laboratories to provide food for the larval and juvenile oysters.

Note: See Commercial Fisheries Review, September 1964 p. 36.

Pesticides

STRINGENT RULES ORDERED IN USE OF PESTICIDES ON LANDS ADMINISTERED BY DEPARTMENT OF THE INTERIOR:

The issuance of stringent rules regarding use of pesticides on the more than 550 million acres of public lands administered by the Department of the Interior was announced by Secretary Stewart L. Udall, September 4, 1964. The rules were developed after an earlier secretarial directive that the Department's standards should set an example for all others to follow. The new guidelines, which apply to all Interior programs for the

control of pest plants and animals, were developed by Frank P. Briggs, Assistant Secretary for Fish and Wildlife.

The order directs that first priority be given to nonchemical methods in pest control. When chemicals are deemed necessary, safety will be the main consideration. Secretary Udall said, "Prior to the use of pesticides, there must be a determination of anticipated results and possible harmful effects. Only chemicals registered for use on a particular pest may be employed, and instructions for use must be carefully followed. It is of the utmost importance that the proposed controls be limited to the target area to avoid contaminating lakes, streams, fish and wildlife, or adversely affecting other interests in the community."

Secretary Udall directed Interior agencies to inform state and local authorities, if their interests are involved, when proposed Interior pest-control activities are to be conducted. He directed that state and local laws be complied with in such programs.

The guidelines require the use of the most selective chemicals available, minimum dosages with the safcst carriers, and application under conditions that leave no reasonable doubt that harmful effects will be minimized. Interior agencies were told to avoid using compounds which are known to concentrate in living organisms, such as DDT, chlordane, dieldrin, and endrin.

Secretary Udall warned that even some of the comparatively safe pesticides, such as malathion, pose hazards to some sensitive species of fish, food organisms, and beneficial insects. He said particular care must be taken to avoid injury to pollenizing insects. He said that while the acute toxic effects of most herbicides are minimal for birds and mammals, the chronic effects are largely unknown. And he noted that some herbicides are highly toxic to fish food organisms. The order requires that advice be obtained from fish and game and health officials before there is any extensive field use of herbicides in close proximity to water areas.

Secretary Udall said that results of chemical pest-control programs carried out by Interior agencies must be appraised by specialists to assure minimum adverse side effects. He thus assigned to the Geological Survey the responsibility of surveillance and study of pesticide effects on water resources of the Department's areas. The Bureau of Sport Fisheries and Wildlife will appraise the effects on fish and wildlife and their food organisms.

Secretary Udall further ordered that all chemical pest-control programs planned by Interior agencies be first reviewed by the Geological Survey, the Bureau of Commercial Fisheries, and the Bureau of Sport Fisheries and Wildlife. The proposed programs then will be forwarded to the Federal Committee on Pest Control, made up of representatives of the Departments of Interior, Agriculture, Defense, and Health, Education, and Welfare. The Federal Committee reviews all chemical control programs that are financed wholly or in part with Federal funds, or are directed or supervised by a Federal agency. Interior's representatives on the Committee are Robert M. Paul, Deputy Assistant Secretary for Fish and Wildlife, and Lansing A. Parker, Associate Director, Bureau of Sport Fisheries and Wildlife.

Secretary Udall said Interior agencies not directly engaged in chemical pest-control programs are required to observe and report any significant contamination of residual accumulations caused by pesticides which may affect the Department's interests.

Preservation

SHELF LIFE OF FROZEN FISH STUDIED:

Freezing is one of the most important commercial methods of preserving fishery products. Since it is known that freezing does not improve the quality of any fishery product above its original quality, the recommendation is always made that only initially high-quality fish should be frozen. Recommendations concerning subsequent frozen storage are more difficult to make, since there is a general lack of information on the combined effects of time of storage in ice prior to freezing and the effects of different constant freezer temperatures upon the frozen storage life of fishery products. The Gloucester (Mass.) Technological Laboratory, U. S. Bureau of Commercial Fisheries, has undertaken a project in which the effects of those variables are being studied.

The first fish species studied was pollock--a fish generally in plentiful supply. Eviscerated pollock, stored in ice at the Bureau's

THE UNIVERSITY OF MICHIGAN LIBRARIES

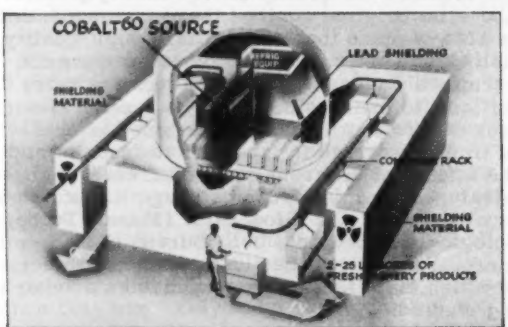
laboratory, was filleted on the 1st, 3rd, 6th, 9th, 13th, and 16th day of ice storage. They were then packaged in commercial type one-pound fillet cartons and in 13½-pound blocks and were frozen in a plate freezer. Frozen one-pound fillet packages were stored at +20°, +10°, 0°, -10° and -30° F., and the blocks at 0° F.

Those products were being tested for acceptance this past summer by organoleptically evaluating them along with freshly frozen controls. The one-pound fillets were tested as a steam-cooked product and the blocks as fried portions. Preliminary results showed average storage life of +10° and +20° F. stored pollock fillets to be 8 and 4 weeks, respectively. Fillets stored at 0° F. reached a stage of borderline acceptance in 15 to 17 weeks' storage. The main causes of quality loss in those products have been discoloration and rancidity. Fried portions made from blocks held in storage up to 22 weeks were found to be acceptable.

Radiation Preservation

ACCEPTANCE TESTS CONDUCTED FOR PETRALE SOLE FILLETS:

Large-scale acceptance tests on radiation-pasteurized petrale sole fillets at Fort Lee, Va., were conducted on September 18 and 25, 1964, by the Seattle Technological Laboratory of the U. S. Bureau of Commercial Fisheries. On both of those days, 300 servings of fish fillets irradiated at 0.3 megarad and 300 servings of unirradiated (control) fillets were judged for acceptability



Sketch of irradiator pilot plant in Gloucester, Mass., adjacent to the U. S. Bureau of Commercial Fisheries Technological Laboratory. The irradiator is a $600,000 Atomic Energy Commission facility to show how the shelf life of fresh marine products may be extended.

using the 9-point hedonic scale. That rating scale reflects varying degrees of "likes" and "dislikes": 9 for "like extremely well" to 1 for "dislike extremely." The test samples were included as part of a regular meal to Army volunteers at Fort Lee. At the time of the tests, the irradiated fish fillet samples had been stored at about 33° F. for 3 and 4 weeks.

Prior to the scheduling of the tests, petrale sole fillets were obtained from three different commercial fish-filleting plants, vaccuum-packed in No. 10 cans, and irradiated at 0.3 megarad. Those samples were frozen and shipped to the U. S. Army Research Laboratories at Natick, Mass., for toxicity tests and to obtain clearance for the Fort Lee tests.

Similar preference tests had been previously conducted at the Seattle laboratory on irradiated petrale sole fillets. The irradiated samples received preference scores that were generally in the same range as those given to the unirradiated samples.

* * * * *

IRRADIATION OF FISH AT SEA PLANNED:

The construction by the Atomic Energy Commission (AEC) of a portable cobalt-60 research irradiator which can be used aboard fishing vessels was near completion this past September. This 14-ton irradiator charged with 25,000 curies of cobalt 60 will be capable of processing about 100 pounds of fish an hour at a level of 150,000 rads. Much of the quality loss in fishery products occurs after the fish are caught and before they are landed at the dock. Irradiation at sea will improve the general quality of landed fish whether it is to be sold fresh, frozen, or reirradiated for even further fresh shelf-life extension. In an effort to carry out research in this area, AEC is planning to make this irradiator available to the U. S. Bureau of Commercial Fisheries for use aboard its exploratory fishing vessel Delaware, which operates out of Gloucester, Mass. When the irradiator is installed aboard the vessel, research will be carried out at sea to provide a basis for evaluating the potential of irradiation at sea.

Notes: Rad = The quantity of ionizing radiation which results in the absorption of 100 ergs per gram of irradiated material at the point of interest.
Erg = Unit of energy.

See Commercial Fisheries Review, October 1964 p. 35; September 1963 p. 33.

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, SEPTEMBER 1964:

Item and Period	1964	1963	1962	1961	1960
	. . . (1,000 Lbs. Heads-Off) . . .				
Total landings, So. Atl. and Gulf States:					
November	-	13,250	12,177	9,996	14,455
October	-	22,022	15,254	12,696	21,688
September	13,200	18,045	13,012	9,691	18,832
August	15,299	19,769	12,340	10,944	20,441
January-July	53,269	55,675	44,441	41,530	58,521
January-December	-	138,254	105,839	91,395	141,035
Quantity canned, Gulf States 1/:					
November	-	2,495	3,028	2,175	1,535
October	-	4,242	4,054	2,065	2,480
September	1,200	3,697	1,759	598	2,222
August	1,560	3,121	1,355	1,090	4,427
January-July	8,496	13,738	11,089	7,756	14,836
January-December	-	28,468	23,322	14,500	26,394
Frozen inventories (as of end of each mo.) 2/:					
November 30	-	42,142	27,500	20,668	37,264
October 31	-	37,418	21,315	17,811	31,209
September 30	-	27,356	12,843	13,361	24,492
August 31	21,952	24,803	12,754	12,728	20,171
July 31	24,315	25,460	13,677	14,849	17,397
June 30	25,546	24,047	13,796	19,416	15,338
May 31	28,082	24,053	13,904	24,696	17,540
Imports 3/:					
November	-	14,759	17,964	14,852	13,516
October	-	20,153	18,279	16,813	14,211
September	-	10,236	9,696	8,629	8,190
August	-	8,598	7,381	6,743	6,407
January-July	82,330	81,487	72,065	63,803	58,684
January-December	-	151,530	141,103	126,268	113,418
	. . .(¢/lb., 26-30 Count, Heads-Off). . .				
Ex-vessel price, all species, So. Atl. and Gulf Ports:					
November	-	52.3	84.5	73.5	54.0
October	-	53.3	90.0	68.7	53.0
September	4/60-70	57.9	90.9	70.1	52.2
August	4/60-73	59.0	83.6	66.1	52.0
July	4/62-72	63.5	82.1	55.8	54.6
June	66.0	77.0	84.4	53.7	64.1
May	61.1	80.9	83.7	52.8	62.9
April	60.0	83.6	82.2	55.4	60.6
Wholesale price, froz. brown (5-lb. pkg.), Chicago, Ill.:					
November	-	71-78	105-110	89-92	69-73
October	-	67-75	108-115	83-90	69-73
September	79-83	73-77	113-118	87-90	65-70
August	78-84	75-81	110-112	76-91	64-67
July	80-85	77-97	-	70-75	72-77
June	80-85	95-102	102-104	67-72	76-77
May	72-83	100-103	96-103	67-69	74-77
April	72-74	100-105	94-97	69-70	74-75

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Tex., only.
Note: September 1964 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JULY-SEPTEMBER 1964:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for July-September 1964, follows:

Oyster Studies: Shortly after the beginning of the quarter, additional experiments were started on the feeding of oysters with carbohydrates. As in the other experiments, 125 uniform size oysters were put in each of a pair of 12 x 12-foot concrete tanks with the water level set so that they maintained about 1,800 gallons each. Approximately 1,200 gallons of new water was pumped into the tanks each week. In the experimental tank the 125 oysters were fed at the rate of a half pound of blackstrap mollasses to each 1,800 gallons of water (20 mg. per liter). The fed oysters gained weight rapidly during the first two weeks, but for the following month their gain in weight was very slight. Towards the last of the experiment the control oysters suffered a high mortality. It has been suggested that this mortality may have been caused by Dermocystidium which, although not prevalent in South Carolina, is known to occur there. During the period of the experiment the salinity in the tanks ranged from 16.2 p.p.t. (parts per thousand) to 25.3 p.p.t., and the temperature from 25.0° C. to 33.0° C. (77° to 91.4° F.). This range of temperature is not conducive to the best oyster growth.

Without disturbing the individual oysters, the experiments were reversed so that the control oysters, which had suffered the high mortality, were fed with mollasses and the experimental oysters were unfed. Mortality rates declined after reversing the feeding.

In mid-August an additional experiment in feeding, this time using cracked rice, was initiated. The oysters fed with cracked rice in two weeks showed a higher increase in weight than those fed with molasses.

During July almost 30 inches of rain fell over coastal South Carolina. This heavy rainfall interfered seriously with the setting of oysters. The top foot of water in the creeks and rivers remained almost entirely fresh for long periods of time, excepting those areas very near the ocean. This condition either killed the young free-swimming oysters or

THE UNIVERSITY OF MICHIGAN LIBRARIES

drove them to deeper waters of higher salinity. In any event, setting was practically nil. However, by mid-August setting again began on clean shell which had been placed in shell bags under the Laboratories' dock. For commercial planters this record-breaking rainfall worked a serious hardship. Shell cultch planted prior to the rain was badly silted by rain and runoff roiling the water. Most oystermen had not completed their shell-planting program prior to the onset of the rain. This will undoubtedly result in a low set of oysters and a smaller crop two years hence.

Shrimp Studies: In March 1964, based on relative abundance of postlarval brown shrimp in plankton tows, Bears Bluff Laboratories predicted that the commercial shrimp harvest in June and July 1964 would be about the same as last year. The commercial landings of shrimp during June and July 1964 amounted to 1,273,000 pounds. For the same period last year the commercial shrimp catch was 1,278,000 pounds.

Postlarval white shrimp were very scarce in plankton tows in the inshore waters of South Carolina this quarter. This, coupled with a decided shortage in the number of white "roe" shrimp in May and June gave rise to predictions by Bears Bluff Laboratories that the 1964 commercial catch of white shrimp would be poor this year. Both experimental trawling and commercial catch statistics have borne out the correctness of these predictions. In the experimental trawls during this quarter the catch per unit of effort was almost the same as that for the same quarter of last year. The commercial catch for August 1963 was 515,532 pounds; for August 1964, 488,025 pounds. Compare this with the August 1960 catch of 1,157,221!

A late run of white roe shrimp was noted in July and August of this year, and postlarvae resulting from the spawning of those shrimp began to show up in September in fair numbers, along with postlarvae of the spotted shrimp (Penaeus duorarum). The recruitment of those postlarvae was so late in the year that it is unlikely they will reach commercial size before the season closes in December, but if those shrimp can survive the winter, the outlook for 1965 may be improved considerably.

Finfish Studies: No major changes were noted in the abundance of commercial fish during the course of the Laboratories' survey work. Croakers, which have become increasingly plentiful in coastal waters during the past five years, were of almost the same abundance during July-September of this year as during that period of 1963. Spot were also found to be almost as plentiful during the quarter as during 1963.

Average Catch Per Unit of Effort at Eight Regular Shrimp Survey Stations, July-September, 1960-1964

Year	Croaker	Spot	Brown Shrimp	White Shrimp
1964	80.5	24.8	31.1	15.4
1963	80.1	27.1	66.9	13.8
1962	75.9	29.5	23.3	58.4
1961	50.3	20.1	8.4	119.9
1960	26.7	39.3	33.9	131.3

Pond Cultivation: Experiments on the pond cultivation of shrimp continued during this quarter. Three ponds were treated with rotenone during July and the stocking and feeding of shrimp in the ponds was carried on through September. All ponds were to be drained and harvested during October 1964.

Due to the scarcity of postlarval and juvenile shrimp in coastal waters this year, the large one-acre ponds could not be stocked adequately, and a small harvest is expected. One of the one-acre ponds was allowed to stock naturally by tidal flow during the early spring and again in June and July. The remaining one-acre pond was allowed to stock naturally also, but in addition was stocked by hand with 2,309 juvenile brown shrimp during June and July.

A small 1/10-acre pond, however, was stocked heavily with juvenile and postlarval shrimp. Shrimp in that pond have been fed very heavily with chopped fish. During June-September the equivalent of over 1,000 pounds of food per acre was added.

Experiments on feeding and productivity are also being carried out in 3,000-gallon concrete tanks which have been stocked heavily with postlarval shrimp. One of those tanks was stocked with about 500 postlarval shrimp (the equivalent of 150,000 per acre) and those shrimp were fed heavily during June-September (through September 1964 the equivalent of over 3,000 pounds per acre of chopped fish had been fed). The experiments should give useful information on growth rates, effects of feeding on mortality, and productivity.

Experiments on the artificial breeding of shrimp were also continued during the quarter

with white shrimp (Penaeus setiferus). The scarcity of white roe shrimp this year has hindered those experiments greatly, and to date no shrimp have been spawned in the recently acquired circular concrete tanks set up at the Laboratories for this purpose. Only about 12 roe shrimp were obtained for the experiments and of those only about half had well developed roe. None of the latter, however, were fertilized and so attempts at spawning were futile. Roe shrimp must be plentiful in coastal waters before any success at those experiments can be expected. The chance of collecting a mature shrimp which is fertilized and in exactly the right stage of roe development is slim unless a considerable number of specimens are available. The experiments will be carried on with brown shrimp, which normally spawn during the fall and winter.

Shrimp of the genus Penaeus can withstand marked changes in salinity, but experimental work at Bears Bluff has indicated juvenile shrimp grow faster at high temperatures and high salinities. The excessive rainfall of July considerably lowered the salinity in the ponds. Actually, the excessive rainfall into the ponds and the greatly lowered salinity in the small creek from which the ponds get their water by tidal action should have reduced pond salinities to practically zero. However, construction of the ponds is such that the decline in salinity was much less than would be expected. Each of the ponds has an overflow which takes waters from the ponds at the surface. Even with a $4\frac{1}{2}$-inch rainfall in 24 hours most of the rainwater remained on the surface of the pond and drained out through the overflow. On July 22, when 20 inches of rain had already fallen during the month, only the top 6 or 8 inches of the ponds were fresh, and in the one-acre ponds below a depth of 18 inches bottom salinity remained in the 20's. Gradually, of course, mixing does occur, but this goes on at a slow rate and high salinities can be maintained despite torrential downpours.

Note: See Commercial Fisheries Review, May 1964 p. 33.

Tropical Atlantic

RESULTS OF FISHERY-OCEANOGRAPHIC STUDIES IN GULF OF GUINEA: M/V "Geronimo" Cruise III (January 15-May 15, 1964): Biological and oceanographic studies in the Gulf of Guinea as part of EQUALANT III were completed in May 1964 by the oceanographic research vessel Geronimo, operated by the Washington, D. C., Biological Laboratory of the U. S. Bureau of Commercial Fisheries. The completion of this cruise ended the field phase of the International Cooperative Investigations of the Tropical Atlantic (ICITA).

Results of the two warm-season surveys made by the Geronimo of the distribution of surface schools of tuna reveal that it is likely that the distribution of those schools is related to upwelling-maturation processes associated, at least in part, with interrelationships among surface currents and coastline configurations. Direct current measurements and other observations made during the EQUALANT III portion of the cruise, have amplified the probable existence of a westerly flowing subsurface current under the easterly flowing Guinea current.

The analyses of stomach samples from tuna collected during this cruise have been completed. Difficulties in identifying the cephalopod component of tuna food were reconciled with the assistance of scientists of the University of Miami.

Identification of scombrid larvae from EQUALANT I was completed this past June. Charts have been prepared showing the distribution of skipjack tuna, yellowfin tuna, black skipjack, auxis, and a group of unidentified scombrid larvae. One interesting aspect was the broad distribution of black skipjack larvae in the pelagic waters of the Gulf of Guinea. Some of the larvae, hitherto unidentified, were tentatively identified at the Bureau's Biological Laboratory, Washington, D. C., by a visiting Japanese scientist, as big-eyed and albacore.

Tuna canneries in Puerto Rico have been visited by a Bureau scientist to arrange for the collection of catch data and biological samples for those tuna caught in the tropical Atlantic and off the east coast of the United States. Those collections are being coordinated with those of the Inter-American Tropical Tuna Commission.

Plans and schedules for Geronimo Cruise IV were completed this past August by scientists of the U. S. Bureau of Commercial Fisheries. The program will essentially be a repeat of seasonal comparison of that carried out during Cruise III.

Note: See Commercial Fisheries Review, July 1964 p. 24; April 1964 p. 47.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-AUGUST 1964:

The U. S. catch of fish and shellfish in 1964 mostly for the first 8 months (in some instances various periods through September 18) was down 190 million pounds as compared with the same period in 1963. The decline occurred principally in landings of menhaden (down 161 million pounds) and Maine sea herring (down 44 million pounds), and to a lesser extent Atlantic ocean perch, shrimp, whiting, Pacific and jack mackerel, halibut, and salmon in Washington.

There were increases in landings of salmon in Alaska, tuna, haddock, and Pacific sardines. Based on the Alaska canned pack and sales to Japanese freezerships, Alaska salmon landings amounted to approximately 291 million pounds--up 83 million pounds as compared with 1963. However, the increase in salmon landings in Alaska was offset by a sharp decrease in Puget Sound landings.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1964 and 1963

Species	Period	1/1964	1963	Total 1963
		.....(1,000 Lbs.).....		
Cod:				
Maine	7 mos.	1,700	1,433	1,960
Mass. 2/	8 "	18,300	22,879	31,475
Total cod		20,000	24,312	33,435
Flounder:				
Maine	7 mos.	700	910	1,216
Mass.	8 "	60,700	61,249	91,876
Total flounder		61,400	62,159	93,092
Haddock:				
Maine	7 mos.	1,700	1,378	2,878
Mass. 2/	8 "	87,000	80,255	106,075
Total haddock		88,700	81,633	108,953
Halibut: 3/				
Alaska	8 mos.	15,600	20,571	22,372
Wash. & Oreg.	8 "	8,100	10,538	11,871
Total halibut		23,700	31,109	34,243
Herring, Maine	7 mos.	24,100	68,148	152,317
Industrial fish (Me. & Mass.) 4/	8 mos.	21,900	40,493	47,897
Mackerel:				
Jack 5/	7 mos.	39,800	45,850	98,078
Pacific 5/	7 "	8,000	16,348	36,974
Menhaden	8 mos.	1,162,600	1,323,642	1,779,500
Ocean perch:				
Maine	7 mos.	30,800	38,417	63,905
Mass.	8 "	23,200	34,388	44,387
Total ocean perch		54,000	72,805	108,292
Pollock:				
Maine	7 mos.	700	1,803	2,489
Mass. 2/	8 "	6,000	5,732	10,727
Total pollock		6,700	7,535	13,216
Salmon, Alaska	Year	290,800	208,249	209,000
Sardine, Pacific	to Sept. 18	6,700	-	7,100
Scallops, sea, New Bedford (meats)	8 mos.	9,400	11,734	15,941
Shrimp (heads-on):				
So. Atl. & Gulf	8 mos.	107,700	120,000	219,900
Tuna, Calif.	to Sept. 12	210,700	196,142	285,285
Whiting:				
Maine	7 mos.	19,700	12,976	15,942
Mass.	8 "	33,300	47,185	64,571
Total whiting		53,000	60,161	80,513
Total all above items		2,189,200	2,370,320	3,323,736
Other 6/		437,000	445,881	1,426,409
Grand total		2,626,200	2,816,201	4,750,145

1/Preliminary.
2/Landed weight.
3/Dressed weight.
4/Excludes menhaden.
5/Cannery receipts.
6/Includes landings for species not listed.
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

U.S. Fishing Vessels

EMERGENCY MEDICAL HELP INSTRUCTIONS FOR FISHERMEN:

Medical assistance available to fishing vessels in the three Pacific Coast States and Alaska is described on cards being distributed by the U. S. Bureau of Commercial Fisheries. However, the same medical assistance is available to all United States fishing vessels.

U. S BUREAU OF COMMERCIAL FISHERIES

California Area
101 S. Seconds
Terminal Island
California

Pacific Region 1
6116 Arcadia Bldg.
Seattle, Wash. 98101

Alaska Region 5
P. O. Box 2401
Juneau, Alaska

MEDICAL ASSISTANCE AVAILABLE TO FISHING VESSELS

The U. S. Department of Health, Education, and Welfare through the Public Health Service Hospitals is available to render expert medical advice to the commercial fishing fleet in emergencies involving serious injury or illness to crew members while at sea. A radio telephone call from the Master of the vessel should be placed through the Marine Operator to the U. S. Public Health Service Hospital nearest the vessel's position. If difficulty is experienced in reaching the Marine Operator, the urgent message code word "PAN" repeated three times (PAN – PAN – PAN) should be used to obtain priority.

U. S. Public Health Service Hospitals within radio telephone range of fishing vessels operating out of Washington, Oregon, California, and Alaska are located at:

131 14th Avenue South, Seattle, Wash. Telephone: EAst 3-9000

19th Avenue and Lake Street, San Francisco, Calif. Telephone: SKyline 2-1480

During normal business hours, 8:00 am to 4:30 pm weekdays, address calls to the OUTPATIENT DEPARTMENT. Nights, weekends, and holidays, address calls to the OFFICER OF THE DAY.

The caller should be thoroughly informed of all circumstances pertinent to the patient's injury or illness. Statements should be confined to facts as found by examination of or related by the patient. Care should be taken not to omit pertinent information.

BEFORE PLACING THE CALL, OBTAIN ANSWERS TO THE FOLLOWING QUESTIONS AND HAVE THIS INFORMATION AVAILABLE IN WRITTEN FORM FOR READY REFERENCE.

1. PATIENT'S NAME AND AGE.
2. STATE OF CONSCIOUSNESS.
3. RESPIRATION RATE AND DIFFICULTY OR PAIN ASSOCIATED WITH BREATHING.
4. PULSE RATE, STRENGTH AND REGULARITY AND TEMPERATURE OF PATIENT.
5. NATURE AND SPECIFIC LOCATION OF PAIN. IS PAIN DULL, SHARP, CONTINUOUS INTERMITTENT, CONFINED TO A SMALL AREA, OR WIDESPREAD?
6. CAUSE OF INJURY (BLOW, BURN, FALL, NATURE OF WOUND, CUTS OR BRUISES).
7. DETERMINE AMOUNT OF BLEEDING.
8. DESCRIBE ANY DEFORMITY OR ABNORMAL FUNCTIONING ON THE PART OF THE PATIENT.
9. KNOW WHAT TREATMENT HAS BEEN GIVEN AND HOW THE PATIENT HAS RESPONDED.
10. ARRANGE FOR CARE OF THE PATIENT UPON ARRIVAL AT PORT – GIVE ESTIMATED TIME OF ARRIVAL AND STATE WHETHER AMBULANCE SERVICE IS NEEDED.

ALWAYS STATE THE NAME AND RADIO CALL LETTERS OF YOUR VESSEL, ITS PRESENT LOCATION, AND ESTIMATED NUMBER OF HOURS FOR ARRIVAL AT DESTINATION.

Card describing medical assistance available to fishing vessels distributed by certain U. S. Bureau of Commercial Fisheries field offices. Only vessels of 5 net tons or more are eligible.

The cards--8 by 10½ inches--are designed for display on fishing vessels so they may be referred to quickly in an emergency. The cards provide detailed instructions for the placing of radiotelephone calls to U.S. Public Health Service hospitals for advice in caring for seriously sick or injured persons at sea.

In a joint announcement, the Bureau's Regional Directors at Terminal Island, Calif., Seattle, Wash., and Juneau, Alaska, said:

"We hope the information on the cards will never be needed, but if it is, it is the sincere desire of the Bureau that it will be instrumental in saving a life or aiding in the treatment of the sick or injured. We recommend that every fishing boat on the Pacific Coast and Alaska have one of the cards posted in the wheelhouse."

The cards were distributed primarily through fishermen's associations, unions, and fish houses. They also may be obtained by writing to the Bureau of Commercial Fisheries at one of the following offices: 101 S. Seaside Avenue, Terminal Island, Calif.; 6116 Arcade Building, 1319 Second Avenue, Seattle, Wash.; or P.O. Box 2481, Juneau, Alaska.

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED:

July 1964: During July 1964, a total of 56 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 76 in July 1963. There were 41 documents cancelled for fishing vessels in July 1964, as compared with 47 in July 1963.

Table 1 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, July 1964 2/

Gross Tonnage	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
			(Number)			
5 - 9	2	1	-	1	5	9
10 - 19	1	-	-	5	7	13
20 - 29	1	-	-	4	6	11
30 - 39	-	-	1	-	2	3
40 - 49	-	-	-	1	1	2
50 - 59	-	-	2	1	2	5
60 - 69	-	-	-	2	-	2
70 - 79	1	-	1	6	-	8
80 - 89	-	-	1	2	-	3
Total	5	1	5	22	23	56

Note: For explanation of footnote, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, July 1964 2/

Length in feet	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
			(Number)			
23 - 23.9	1	-	-	-	-	1
26 - 26.9	-	-	-	-	1	1
27 - 27.9	-	-	-	-	2	2
28 - 28.9	-	-	-	-	1	1
29 - 29.9	-	-	-	-	1	1
30 - 30.9	-	-	-	1	2	3
31 - 31.9	-	-	-	-	1	1
32 - 32.9	1	-	-	-	-	1
33 - 33.9	1	1	-	1	1	4
35 - 35.9	-	-	-	-	1	1
36 - 36.9	-	-	-	1	1	2
37 - 37.9	-	-	-	1	-	1
38 - 38.9	-	-	-	3	-	3
39 - 39.9	1	-	-	-	3	4
40 - 40.9	-	-	-	-	1	1
41 - 41.9	-	-	-	1	2	3
42 - 42.9	-	-	-	-	2	2
43 - 43.9	-	-	-	1	-	1
44 - 44.9	-	-	1	-	-	1
45 - 45.9	-	-	-	1	-	1
49 - 49.9	-	-	-	-	4	4
55 - 55.9	-	-	1	1	-	2
58 - 58.9	-	-	-	1	-	1
59 - 59.9	1	-	-	-	-	1
60 - 60.9	-	-	-	1	-	1
61 - 61.9	-	-	1	-	-	1
62 - 62.9	-	-	-	1	-	1
63 - 63.9	-	-	1	-	-	1
65 - 65.9	-	-	-	5	-	5
66 - 66.9	-	-	1	1	-	2
67 - 67.9	-	-	-	1	-	1
68 - 68.9	-	-	-	1	-	1
Total	5	1	5	22	23	56

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, July 1964 with Comparisons

Area (Home Port)	July		Jan.-July		Total
	1964	1963	1964	1963	1963
			(Number)		
Issued first documents 2/:					
New England	5	4	24	14	23
Middle Atlantic	-	4	5	12	18
Chesapeake	1	9	24	31	66
South Atlantic	5	11	30	44	77
Gulf	22	20	142	135	239
Pacific	23	28	103	136	160
Great Lakes	-	-	1	3	5
Hawaii	-	-	1	-	-
Puerto Rico	-	-	1	2	2
Total	56	76	331	377	590
Removed from documentation 3/:					
New England	9	7	20	33	48
Middle Atlantic	3	12	10	39	47
Chesapeake	3	2	11	12	25
South Atlantic	1	3	15	37	53
Gulf	5	14	39	76	118
Pacific	20	9	87	60	87
Great Lakes	-	-	6	9	15
Hawaii	-	-	-	1	3
Total	41	47	188	267	396

Note: For explanation of footnotes, see table 4.

Table 4 - U. S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, July 1964 2/

Horsepower	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
			(Number)			
40	-	-	-	-	1	1
61	-	-	-	1	-	1
85	-	-	-	1	-	1
90	-	-	-	-	2	2
125	-	-	-	-	1	1
130 - 139	-	-	-	1	2	3
140	1	-	-	-	-	1
150 - 159	-	-	-	1	2	3
160 - 169	1	-	1	4	3	9
170	-	-	-	2	3	5
185	-	-	-	-	2	2
190	-	1	-	1	-	2
200	-	-	-	1	-	1
220 - 229	2	-	2	5	1	10
230	-	-	-	1	-	1
240	-	-	-	-	1	1
280	-	-	-	-	1	1
300	-	-	-	3	4	7
320 - 329	-	-	2	1	-	3
335	1	-	-	-	-	1
Total	5	1	5	22	23	56

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes 2 redocumented vessels in July 1964 that were previously removed from the records. Vessels issued first documents as fishing craft were built: 43 in 1964; 1 in 1963; 1 in 1962; 1 in 1960; and 10 prior to 1959.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

June 1964: During June 1964, a total of 72 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 62 in June 1963. There were 31 documents cancelled for fishing vessels in June 1964, the same as in June 1963.

Table 1 - U.S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, June 1964 with Comparisons

Area (Home Port)	June 1964	June 1963	Jan.-June 1964	Jan.-June 1963	Total 1963
			(Number)		
Issued first documents 2/:					
New England	6	-	19	10	23
Middle Atlantic	-	1	5	8	18
Chesapeake	5	5	23	22	66
South Atlantic	4	6	25	33	77
Gulf	28	18	120	115	239
Pacific	27	30	80	108	160
Great Lakes	-	1	1	3	5
Hawaii	1	-	1	-	-
Puerto Rico	1	1	1	2	2
Total	72	62	275	301	590
Removed from documentation 3/:					
New England	3	2	11	26	48
Middle Atlantic	3	5	7	27	47
Chesapeake	1	-	8	10	25
South Atlantic	4	7	14	34	53
Gulf	7	7	34	62	118
Pacific	13	8	67	51	87
Great Lakes	-	2	6	9	15
Hawaii	-	-	-	1	3
Total	31	31	147	220	396

Note: For explanation of footnotes, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, June 1964 2/

Length in feet	New England	Chesapeake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	Total
				(Number)				
26 - 26.9	1	-	-	-	1	-	-	2
27 - 27.9	-	-	-	1	-	-	-	1
28 - 28.9	-	-	-	1	1	-	-	2
29 - 29.9	-	-	1	1	4	-	-	6
30 - 30.9	-	-	-	-	1	-	-	1
31 - 31.9	-	1	-	-	4	-	-	5
32 - 32.9	2	-	-	-	1	-	-	3
33 - 33.9	-	-	-	2	-	-	-	2
34 - 34.9	-	-	-	1	-	-	-	1
35 - 35.9	-	1	-	-	1	-	-	2
36 - 36.9	1	-	-	-	1	-	-	2
37 - 37.9	-	2	-	-	2	-	-	4
38 - 38.9	-	-	-	1	-	-	-	1
40 - 40.9	1	1	-	-	-	1	-	3
41 - 41.9	-	-	-	1	1	-	-	2
42 - 42.9	-	-	-	-	1	-	-	1
43 - 43.9	-	-	-	-	1	-	-	1
44 - 44.9	-	-	-	1	-	-	-	1
45 - 45.9	-	-	-	-	3	-	-	3
46 - 46.9	-	-	-	-	2	-	-	2
48 - 48.9	-	-	1	-	-	-	-	1
49 - 49.9	1	-	-	-	3	-	-	4
51 - 51.9	-	-	-	1	-	-	-	1
53 - 53.9	-	-	-	1	-	-	-	1
57 - 57.9	-	-	-	1	-	-	-	1
60 - 60.9	-	-	-	1	-	-	-	1
61 - 61.9	-	-	-	2	-	-	-	2
62 - 62.9	-	-	-	2	-	-	-	2
63 - 63.9	-	-	-	2	-	-	-	2
64 - 64.9	-	-	-	1	-	-	-	1
65 - 65.9	-	-	2	7	-	-	-	9
67 - 67.9	-	-	-	1	-	-	-	1
153 - 153.9	-	-	-	-	-	-	1	1
Total	6	5	4	28	27	1	1	72

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, June 1964 2/

Horsepower	New England	Chesapeake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	Total
				(Number)				
60	1	-	-	-	-	-	-	1
70	-	1	-	-	-	-	-	1
80-89	1	-	-	2	1	-	-	4
97	-	-	-	1	-	-	-	1
100-109	-	-	-	-	6	1	-	7
110-119	1	-	1	2	-	-	-	4
130-139	-	-	-	2	1	-	-	3
140-149	-	-	-	1	2	-	-	3
160-169	-	1	1	3	6	-	-	11
170	-	-	-	2	-	-	-	2
180	-	-	-	-	1	-	-	1
210	-	1	-	-	3	-	-	4
220-229	2	2	2	6	-	-	-	12
230	-	-	-	1	-	-	-	1
245	-	-	-	1	-	-	-	1
250	-	-	-	1	2	-	-	3
280	-	-	-	-	3	-	-	3
300	-	-	-	5	1	-	-	6
330	-	-	-	-	1	-	-	1
340	-	-	-	1	-	-	-	1
370	1	-	-	-	-	-	-	1
1600	-	-	-	-	-	-	1	1
Total	6	5	4	28	27	1	1	72

Note: For explanation of footnote, see table 4.

Table 4 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, June 1964 2/

Gross Tonnage	New England	Chesa-peake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	Total
				(Number)				
5 - 9	1	3	-	1	2	-	-	7
10 - 19	4	2	1	8	12	1	-	28
20 - 29	-	-	-	-	4	-	-	4
30 - 39	1	-	1	2	3	-	-	7
40 - 49	-	-	-	-	3	-	-	3
50 - 59	-	-	-	3	2	-	-	5
60 - 69	-	-	-	3	1	-	-	4
70 - 79	-	-	2	8	-	-	-	10
80 - 89	-	-	-	1	-	-	-	1
90 - 99	-	-	-	2	-	-	-	2
800 - 809	-	-	-	-	-	-	1	1
Total	6	5	4	28	27	1	1	72

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes 2 redocumented vessels in June 1964 that were previously removed from the records. Vessels issued first documents as fishing craft were built: 60 in 1964; 2 in 1963; and 10 prior to 1954.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, JULY 1-SEPTEMBER 30, 1964:

From the beginning of the program in 1956 through September 30, 1964, a total of 1,532 loan applications for $40,944,229 were received by the U. S. Bureau of Commercial Fisheries, the Agency administering the Federal Fisheries Loan Fund. Of the total, 811 applications ($18,281,097) had been approved, 509 ($12,366,919) had been declined or found ineligible, 181 ($7,403,905) had been withdrawn by the applicants before being processed, and 31 ($906,669) were pending. Of the applications approved, 304 were approved for amounts less than applied for. The total reduction was $1,985,639.

The following loans were approved from July 1, 1964, through September 30, 1964:

New England Area: Richard L. Spencer, Stonington, Maine, $5,000, and Clinton A. Babcock, Wakefield, R. I., $10,000.

California: Giuseppe Pennisi, Pacific Grove, $25,000, and Donald R. Brown, Santa Rosa, $9,000.

South Atlantic and Gulf Area: A. Irving Tormala, Fort Myers, Fla., $2,805; Elton S. Olier, Brownsville, Tex., $25,600; and Percy L. Wilhelm, Brownsville, Tex., $22,400.

Pacific Northwest Area: Ralph I. Lund, Bainbridge Island, Wash., $40,363; Merrill W. Henington, Poulsbo, Wash., $55,000; Harvey A. Harbaugh & Walter E. Linney, Seattle, Wash., $56,249; John B. Iverson, Seattle, Wash., $28,000; Roy E. Johnson, Seattle, Wash., $7,400; Ernest T. Mathisen, Seattle, Wash., $20,000; and Edwin E. & Donald Reyburn, Seattle, Wash. $6,000.

Alaska: John Goeres, Cordova, $15,000; Brechan Enterprises, Inc., Kodiak, $68,500; Sam E. Franklin, Kodiak, $4,917; Margarete von Scheele, Kodiak, $47,500; Carl A. Mills, Sitka, $12,000; and Robert I. Ditman & George W. Hillar, Valdez, $17,600.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the third quarter of 1964, 5 applications for $351,637 were received and 1 application for $35,483 was approved. Since the program began (July 5, 1960), 61 applications were received for $5,508,251. Of the total, 45 applications were approved for $3,005,504 and 10 applications for $1,805,131 were pending as of September 30, 1964. Since the mortgage program began, applications received and approved by area are:

New England Area: Received 12 ($1,314,500), approved 8 ($775,365).

California Area: Received and approved 1 ($557,000).

South Atlantic and Gulf Area: Received 38 ($1,735,727), approved 29 ($1,110,819).

Pacific Northwest Area: Received 7 ($1,846,250), approved 4 ($507,546).

Alaska Area: Received 3 ($54,774), approved 3 ($54,774).

The time for acceptance of applications for emergency fishery disaster loans to fishermen who had fishing vessels or gear lost or damaged in the Alaska earthquake and resulting tidal wave was extended by the Bureau from September 30 to October 31, 1964.

* * * * *

NEW SMALL STERN-TRAWLER "CANYON PRINCE":

Following trials in August 1964, the new small stern-trawler Canyon Prince was delivered to its owners in Point Judith, R. I. The 64-foot vessel was built by the same firm in Warren, R. I., which pioneered the development of small automated stern-trawlers with the launching of the 83-foot Narragansett in January 1963. An automated net-handling system is a prime feature of both vessels. A loaded net can be hauled on board the Canyon Prince by a single deckhand, as was demonstrated by a 17-year old girl during the vessel's trials. All hoists and winches are controlled from the pilothouse which overlooks the deck.

The Canyon Prince has a maximum holding capacity of 100,000 pounds of ice and fish.

Fig. - 1 New small stern-trawler Canyon Prince. Note the net drum midship.

Fig. 2 - Young girl hauls in bull rope at deck capstan on Canyon Prince, in a demonstration of automated net-handling equipment requiring a single deckhand.

Fig. 3 - Cod-end approaches Canyon Prince; balance of net to the left is hauled by net drun.

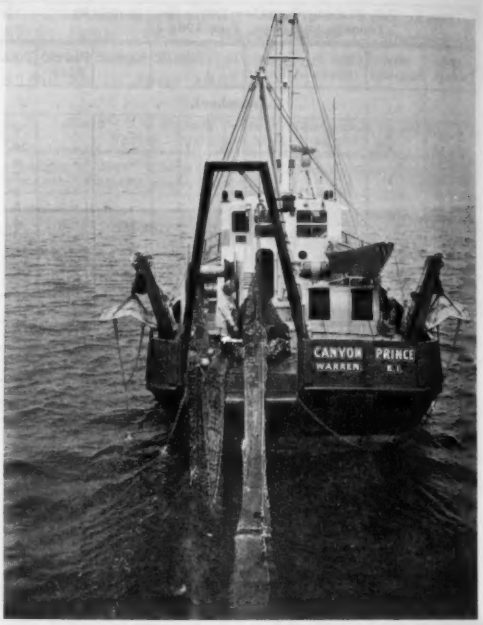


Fig. 4 - Cod-end comes over stern chute.

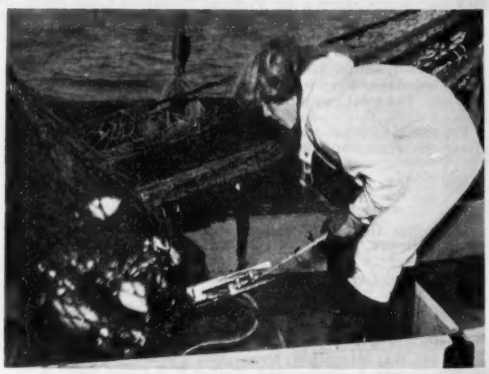


Fig. 5 - Tripping cod-end closer used aboard the Canyon Prince.

Power is provided by a Diesel engine of 340 horsepower which drives the vessel at a speed of $11\frac{1}{2}$ knots. Equipped with electronic fish-finding and navigating equipment, the vessel is particularly suited for trawling in marine canyons on the edge of the Continental Shelf. Being a western rig, it can be used for all types of fishing.

Note: See Commercial Fisheries Review, March 1963 p. 34; May 1962 p. 32.

U. S. Foreign Trade

AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-MAY 1964:

Airborne fishery imports into the United States in May 1964 were down 41.9 percent in quantity and 40.7 percent in value from those in the previous month due mainly to smaller shipments of shrimp from Venezuela.

Total airborne shrimp imports in May 1964 consisted of 304,917 pounds of fresh and frozen raw headless and 16,101 pounds of unclassified shrimp. About 95 percent of the airborne shrimp arrivals in May 1964 entered through the Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.), Galveston (Tex.), Los Angeles (Calif.), and New York (N. Y.).

Airborne finfish imports in May 1964 consisted mainly of fish fillets from Mexico.

Total airborne fishery imports in January-May 1964 were down 29.8 percent in quantity and 30.5 percent in value from those in the same period of 1963. The decline was due to smaller shipments of shrimp and lobsters.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

U. S. 1/Airborne Imports of Fishery Products, January-May 1964 with Comparative Data

Product and Origin 2/	1964 May Qty. 3/	1964 May Value 4/	1964 Jan.-May Qty. 3/	1964 Jan.-May Value 4/	1963 Jan.-May Qty. 3/	1963 Jan.-May Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
Portugal	-	-	0.1	0.1	-	-
Mexico	42.1	11.5	150.9	41.9	124.3	38.6
British Honduras	-	-	1.8	0.4	33.9	8.6
Honduras	-	-	-	-	15.5	4.0
Japan	-	-	-	-	2.0	8.2
United Kingdom	0.2	0.4	1.9	3.6	1.3	3.3
Iran	-	-	-	-	1.2	7.4
France	-	-	4.3	7.8	0.7	0.6
Israel	-	-	1.3	0.8	-	-
Venezuela	-	-	4.6	1.7	-	-
Ireland	0.3	0.3	0.3	0.3	0.8	0.3
Denmark	0.1	0.3	0.3	0.4	-	-
Canada	-	-	15.2	4.3	-	-
Iceland	-	-	1.8	1.2	-	-
Spain	1.0	0.8	1.8	1.4	-	-
Total fish	43.7	13.3	182.3	63.9	179.7	71.0
Shrimp:						
Guatemala	-	-	-	-	117.1	62.1
El Salvador	15.0	10.4	159.1	96.8	163.5	115.0
Honduras	-	-	-	-	22.7	11.9
Nicaragua	16.1	9.6	47.2	27.6	256.8	85.0
Costa Rica	14.5	8.3	163.7	90.7	284.0	137.3
Panama	77.9	51.9	413.1	248.8	723.5	389.6
Venezuela	197.3	105.7	1,726.7	767.0	1,920.2	941.4
Ecuador	-	-	-	-	94.3	32.7
France	-	-	-	-	2.6	0.9
British Guiana	-	-	10.5	5.2	-	-
Mexico	-	-	-	-	5.0	1.8
Spain	0.2	0.1	0.2	0.1	-	-
Total shrimp	321.0	186.0	2,520.5	1,236.2	3,589.7	1,777.7
Shellfish other than shrimp:						
Mexico	-	-	9.0	4.8	73.0	42.6
British Honduras	-	-	82.8	50.4	108.9	78.5
El Salvador	-	-	-	-	5.0	3.6
Honduras	4.5	0.8	12.9	9.4	1.9	1.0
Nicaragua	-	-	50.5	40.0	71.3	49.3
Costa Rica	-	-	9.3	9.5	73.8	60.1
Jamaica	-	-	43.6	36.2	47.7	36.8
Netherlands Antilles	-	-	-	-	32.8	20.9
Colombia	-	-	-	-	6.4	15.8
Ecuador	-	-	-	-	2.2	1.8
Tunisia	-	-	-	-	0.8	0.9
British Guiana	5.9	1.6	14.5	3.2	1.7	0.3
Canada	-	-	1.2	0.9	128.5	66.3
Venezuela	-	-	-	-	13.7	8.9
Dominican Republic	3.8	0.5	7.4	1.1	6.2	5.0
Bahamas	-	-	10.6	6.8	-	-
Haiti	1.1	0.5	5.1	2.6	-	-
Other countries	0.2	0.3	0.4	0.5	2.5	2.1
Total shellfish (excl. shrimp)	15.5	3.7	247.3	165.4	576.4	391.0
Grand total	380.2	203.0	2,950.1	1,465.5	4,345.8	2,239.7

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipments is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i. e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, May 1964, U. S. Bureau of the Census.

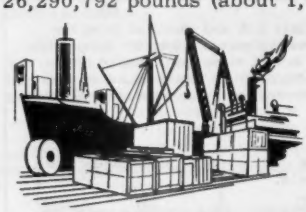
Total airborne fishery imports in January-May 1964 were down 29.8 percent in quantity and 30.5 percent in value from those in the same period of 1963. The decline was due to smaller shipments of shrimp and lobsters.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-August 29, 1964, amounted to 26,290,792 pounds (about 1,251,942 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. This was substantially less (21.3 percent) than the 33,425,128 pounds (about 1,591,673 standard cases) imported during January 1-August 31, 1963.



The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1964 at the 12½-percent rate of duty is limited to 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

* * * * *

PROCESSED EDIBLE FISHERY PRODUCTS, JULY 1964:

United States imports of processed edible fishery products in July 1964 were up 25.3 percent in quantity and 12.6 percent in value from those in the previous month. In July there were much larger imports of groundfish fillets and blocks (increase mainly from Canada) and canned tuna in brine (increase mainly from Japan).

Compared with the same month in 1963, imports in July 1964 were down 6.2 percent in quantity and 5.3 percent in value, due mainly to smaller imports of groundfish blocks and canned tuna in brine. Imports were also down for canned crab meat, canned oysters, and canned salmon. But imports were up substantially for canned sardines not in oil, flounder fillets, sea catfish fillets, and ocean perch fillets.

In January-July 1964, imports were up 3.4 percent in value from those in January-July 1963, but the quantity of the im-

ports was almost the same for both periods. During January-July 1964, there was a sizable increase in imports of groundfish fillets and blocks (increase mainly from Canada and Iceland), flounder fillets, yellow pike fillets, and sea catfish fillets. But there was a considerable decline in imports of canned tuna, canned sardines not in oil, canned crab meat, and swordfish fillets.

U. S. Imports and Exports of Processed Edible Fishery Products, July 1964 with Comparisons

Item	Quantity				Value			
	July		Jan.-July		July		Jan.-July	
	1964	1963	1964	1963	1964	1963	1964	1963
	(Millions of Lbs.)				(Millions of $)			
Fish & Shellfish:								
Imports 1/	48.1	51.3	292.0	292.1	14.3	15.1	87.7	84.8
Exports 2/	2.8	1.8	23.6	18.4	1.4	1.0	10.4	7.6

1/Includes only those fishery products classified by the U. S. Bureau of the Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i.e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/Excludes fresh and frozen.

Exports of processed edible fish and shellfish from the United States in July 1964 were down 15.2 percent in quantity from those in the previous month, although the value of the exports was the same in both months. There was a sharp decline in exports of the lower-priced canned mackerel, and somewhat lower shipments of canned sardines and canned shrimp. Exports of canned salmon (principally to the United Kingdom) showed little change from the previous month. There was a sharp increase in exports of canned squid due to larger shipments to Greece.

Compared with the same month of the previous year, the exports in July 1964 were up 55.6 percent in quantity and 40.0 percent in value. Larger shipments this July of canned salmon and canned squid more than offset smaller shipments of canned shrimp, canned sardines not in oil, and canned mackerel.

Processed fish and shellfish exports in the first 7 months of 1964 were up 28.3 percent in quantity and 36.8 percent in value from those in the same period of 1963. In January-July 1964 there were much larger shipments of canned mackerel. Shipments of canned salmon, canned sardines in oil, and canned shrimp were also higher, but exports of canned sardines not-in-oil and canned squid were down sharply.

Notes: (1) Prior to October 1963, the data shown above were included in news articles on "U. S. Imports and Exports of Edible Fishery Products." Before October 1963, data showing "U. S. Imports of Edible Fishery Products" summarized both manufactured and crude products. At present, a monthly summary of U. S. imports of crude or nonprocessed fishery products is not available; therefore, only imports of manufactured or processed fishery products are reported. The import data are, therefore, not comparable to previous reports of "U. S. Imports of Edible Fishery Products."
The export data shown are comparable to previous data in "U. S. Exports of Edible Fishery Products." The export data in this series have always been limited to manufactured or processed products.
(2) See Commercial Fisheries Review, Oct. 1964 p. 41.

Wages

NEW MINIMUM WAGES FOR ONSHORE FISHERY WORKERS:

Effective September 3, 1964, the minimum wage for onshore fishery workers, other than cannery workers, advanced to $1.15 an hour, pursuant to the Fair Labor Standards Act, as amended. The minimum wage for those onshore fishery workers will rise to $1.25 per hour on September 3, 1965. Fish cannery workers have been subject to the $1.25 minimum wage rate since September 3, 1963.
Note: See Commercial Fisheries Review, September 1963 p. 104.

Washington

SURVEY OF FISH AND WILDLIFE RESOURCES OF PUGET SOUND AND ADJACENT WATERS:

A Fisheries and Wildlife Technical Committee has been formed to make a comprehensive study of Puget Sound and adjacent waters in Washington State. The fish and wildlife study is part of a comprehensive Federal-State review of Puget Sound in which water and associated land resources will be examined to develop a multipurpose plan to meet short and long-term needs of the region.

The Committee will consider all water resource functions including hydroelectric power generation, fish and wildlife conservation and development, irrigation, flood control and drainage, recreation, navigation, and water quality control. The study is scheduled for completion in 1969 when a detailed report will be released.

The Fisheries and Wildlife Technical Committee includes representatives from the Washington State Department of Fisheries, the Washington State Department of Game, and the following Federal Agencies: Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries, both of the Fish and Wildlife Service; Forest Service; Soil Conservation Service; Economic Research Service; Corps of Engineers; Bureau of Outdoor Recreation; and the Public Health Service. Other Federal, state, county, and municipal agencies and groups are expected to contribute materially to the overall study.

The survey will include a study of fish and wildlife populations, distribution, and habitat; and a determination of commercial harvest and man days of fishing and hunting. An immediate task will be to determine basic fish and wildlife resource needs in specific basins and to alert water development agencies concerning protective and enhancement measures required in project planning. The primary emphasis during the first part of the study

will be on the Nooksack, Skagit, and Snohomish River basins.

Weather

STORM WARNING BUOYS FOR GULF OF MEXICO:

An open sea weather observation and warning buoy was established in the Gulf of Mexico in mid-August 1964 by the U. S. Coast Guard. Known as the MAMOS (Marine Automatic Meteorological Observing Station), the new station will enable the U. S. Weather Bureau to receive advance indications of dangerous storms.

Made of aluminum, the unmanned buoy is 20 feet long, 12 feet wide, weighs 3½ tons, and costs about $250,000. It is capable of operating a full year without attendance. Power for the buoy's electronic equipment is supplied by storage batteries, charged by wind-driven generators.

Weather measurements taken by the buoy are transmitted at regular intervals to inland receiving stations. Those measurements include air and water temperature, barometric pressure, and wind speed and direction.

A second MAMOS was established in the Gulf of Mexico in late September 1964. Future plans call for a total of 45 of the storm warning buoys.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, SEPTEMBER 1964:

Wholesale prices for most fresh fish and shellfish were higher from August to September 1964 and the overall wholesale price index for September rose 3.9 percent from the previous month. At 109.5 percent of the 1957-59 average, the index this September was 2.2 percent higher than in the same month of 1963.

Prices for all of the major products in the subgroup index for drawn, dressed, or whole finfish were higher this September than in the previous month and the index was up 11.6 percent. The only exception was Lake Superior whitefish with

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1964 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Sept. 1964	Aug. 1964	Sept. 1964	Aug. 1964	July 1964	Sept. 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					109.5	105.4	106.6	107.1
Fresh & Frozen Fishery Products:					113.3	106.9	109.3	110.6
Drawn, Dressed, or Whole Finfish:					127.9	114.6	114.9	125.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.11	110.9	83.3	88.6	98.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.55	.42	153.4	122.7	118.3	128.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.98	.93	136.2	129.2	129.2	138.0
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.48	.53	70.9	78.3	78.3	100.7
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.55	.54	90.1	88.4	83.5	99.9
Processed, Fresh (Fish & Shellfish):					107.4	101.1	105.5	104.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.44	.36	106.9	86.2	83.8	104.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.82	.77	95.5	89.6	98.4	83.2
Oysters, shucked, standards	Norfolk	gal.	7.25	7.00	122.2	118.0	118.0	130.7
Processed, Frozen (Fish & Shellfish):					100.0	100.0	102.5	97.4
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.37	.38	92.5	95.0	95.0	100.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.37	.37	108.5	108.5	108.5	105.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.31	103.4	106.9	108.7	117.5
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.81	.80	95.5	94.9	99.0	90.1
Canned Fishery Products:					103.1	103.1	102.2	101.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.75	22.25	94.8	97.0	97.0	104.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.1	96.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	6.25	6.25	105.9	105.9	105.9	97.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.00	9.31	128.3	119.4	113.0	102.1

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

prices at Chicago down 9.5 percent. The more substantial price increases this September were for ex-vessel large haddock (up 33.1 percent) at Boston and western fresh halibut (up 25.0 percent) at New York City. Fresh halibut from the seasonal Pacific Northwest fishery were scarce in September due to the lower catches throughout most of the season and closure of the main fishing areas. Halibut landings by the end of the 1964 season should be down better than 10 million pounds from the previous year. At New York City, prices for fresh dressed king salmon (up 5.4 percent) were higher than in August, and there was a smaller increase in prices for fresh round yellow pike. As compared with September 1963, the subgroup index for drawn, dressed, or whole finfish this September was 1.8 percent higher because of higher prices for haddock and western halibut. Those higher prices were offset by lower prices for the remaining items in the subgroup.

The subgroup index for processed fresh fish and shellfish rose 6.3 percent from August to September and was higher than in September 1963 by 3.1 percent. Prices this September for fresh haddock fillets at Boston increased 24.0 percent from the previous month as a direct result of higher ex-vessel haddock prices. South Atlantic fresh shrimp prices (up 6.6 percent) at New York City were considerably stronger in September and there was a price increase for shucked standard oysters (up 25 cents a gallon) at Norfolk. As compared with September 1963, the subgroup index this September was 3.1 percent higher largely because of substantially higher prices for fresh shrimp and haddock fillets.

Several price changes this September for items in the processed frozen fish and shellfish subgroup did not affect the subgroup index which at 100 percent of the 1957-59 average remained unchanged from the previous month. But the index this September was 2.7 percent higher than in September 1963. Frozen shrimp prices (up 0.6 percent) at Chicago in September were up only slightly from August. The small price increase for shrimp, however, cancelled out price declines for ocean perch fillets (down 3.3 percent) and flounder fillets (down 2.6 percent). Prices for frozen shrimp this September were up 6.0 percent and for haddock fillets were up 2.8 percent from September 1963.

Although price changes occurred this September within the subgroup for canned fishery products, the index at 103.1 percent of the 1957-59 average was the same as in August. Prices for canned Maine sardines were up 7.5 percent from the previous month (and 25.7 percent higher than in September 1963). Supplies of canned sardines were low and the new season pack was far short of normal. Prices for canned pink salmon were down 2.3 percent from August to September because of liberal supplies. As of the end of September 1964, the Alaska canned salmon pack was 3.5 million cases, of which 1.9 million cases were pinks. As compared with September a year earlier, the subgroup index this September was 1.7 percent higher. September 1964 prices were up for all canned fish products except pink salmon (down 9.4 percent from September 1963).

COPIES OF MARKET NEWS LEAFLETS STILL AVAILABLE

A limited number of free copies of the following Market News Leaflets issued earlier in 1964 are still available and will be mailed on request as long as the supplies last:

MNL- 5--Denmark's Fisheries, 1963, and 1964 Trends

MNL- 8--Portugal's Fishing Industry, 1963

MNL-11--Fishing Industry in Spain, 1963

MNL-14--United Kingdom's Fishing Industry, 1959-1963

MNL-18--Panama's Fishing Industry, 1963

MNL-23--Fisheries of Chile, Part II and Part III - Central and South Chile, 1960-1962

MNL-23 (Supplement)--Fisheries of Chile, Part II and Part III--Central and South Chile, 1961-1963 (Statistics)

MNL-26--Taiwan Fisheries in 1963

MNL-32--Venezuelan Commercial Catch, Foreign Trade, and Major Developments for 1961-1962

MNL-40--Moroccan Fishing Industry, 1962-1963

MNL-44--Iceland's Fishing Industry, 1963

MNL-52--Menhaden Fish Oil Prices--New York City, 1953-1963, and January 1964

MNL-57--Fisheries in the Federal Republic of Germany, Annual Survey 1962

MNL-87--Survey of the Dominant Conditions Affecting the Development of the Cartagena Fishery (Colombia)

MNL-88--Japan's Imports and Exports of Fisheries Products, 1961-1962

MNL-89--Peru: Fish Meal and Oil Report, 1963

For copies of any of these leaflets, write to the Fishery Market News Service, U.S. Bureau of Commercial Fisheries, Rm. 510, 1815 N. Fort Myer Dr., Arlington, Va. 22209.

International

NORTH PACIFIC FISHERIES CONVENTION

PARTIES TO THE CONVENTION RESUMED TALKS IN OTTAWA:

The third round in a series of talks between Canada, Japan, and the United States on the International Convention for the High Seas Fisheries of the North Pacific Ocean opened in Ottawa, September 9, 1964.

When ratified in 1953, the Convention had a guaranteed minimum life of 10 years and, thereafter, until 1 year from the date on which any member should give notice of termination. No such notice has been given, but last year, at the request of Japan, two rounds of negotiations took place among the contracting parties. The first round was held in Washington in June and the second in Tokyo during September and October.

During those meetings the Convention was reviewed to find a basis for resolving the different views developed as a result of the experience gained since 1953. Japan submitted a new draft convention which also was given consideration during the meetings.

Progress towards an agreement was made during the first two rounds of talks, but a further meeting was considered necessary which, at Canada's invitation, was held in Ottawa.

The United States Delegation to the Ottawa meeting was headed by Ambassador Benjamin A. Smith, and included Commissioner Clarence F. Pautzke, U. S. Fish and Wildlife Service, William C. Herrington, Special Assistant for Fisheries and Wildlife to the Under Secretary of State, and Director Donald L. McKernan, Bureau of Commercial Fisheries, U. S. Department of the Interior, as well as Congressional and other Advisers. On September 14, 1964, the U. S. Senate's President pro tempore appointed Senators Bartlett and Long to attend the meeting.

President Johnson from the White House on September 4, 1964, issued this statement regarding the negotiations of the parties to the International Convention for the High Seas Fisheries of the North Pacific Ocean:

"The third round of negotiations with Canada and Japan on North Pacific fisheries problems is scheduled to begin in Ottawa on September 9. I have just received a report on the issues involved from Ambassador Benjamin A. Smith II, who will head the United States Delegation in these negotiations. The major problem with which the negotiations will deal is the revision of the existing international arrangements for the conservation and rational utilization of the fishery resources in the north Pacific Ocean.

"Two earlier rounds of negotiations were held in Washington and Tokyo last year. They made substantial progress toward full agreement. I hope the negotiations can be completed during the new round of discussions.

"The primary objective of the United States in these negotiations is to protect the interests of Alaska and the Pacific Northwest in the North Pacific fisheries, which consist principally of salmon and halibut. The economy of these regions is heavily dependent upon the U. S. fisheries supported by these resources. The interests of the United States in these fishery stocks have been advanced by the International Convention for the High Seas Fisheries of the North Pacific Ocean. Basic to that Convention is the concept that in special situations, such as those exemplified by the North American salmon and halibut fisheries, where the countries participating in the fisheries have built up and maintained the resources through major research and regulatory programs, other countries should exercise restraints on their fishing of the type provided for in that Convention. This concept provides the incentives necessary to the establishment and continuation of the conservation measures essential to the attainment, both now and in the future, of the maximum harvest of food for mankind. This will insure the conservation of important marine resources and prevent irreparable damage to them through over-exploitation. This is in the common interest of Japan, Canada, and the United States.

"Over the years we have made major contributions to the restoration and maintenance of the salmon and halibut fisheries. For this reason, we have a special interest in them. We are determined to protect that interest, while giving every consideration to the legitimate interests of the other parties to the convention. I am confident that Ambassador Smith, who was the United States representative during the earlier discussions, will effectively present our point of view.

"I urge that the three delegations work out a solution that will permit the conservation of these resources for future generations, taking into account the unique circumstances surrounding the Convention and the interests of all parties to it."

Note: See Commercial Fisheries Review, November 1963 p. 54; June 1963 p. 57.

* * * * *

JAPANESE FISHING INDUSTRY POSITION ON NEGOTIATIONS:

The Japan-United States-Canada Special Committee of the Japan Fisheries Society, at a meeting on August 2, 1964, in Tokyo, formulated the Japanese fishing industry's position on the North Pacific Fisheries Convention renegotiation talks in Ottawa. The talks began September 9, 1964. Gist of the industry's recommendations submitted to the Japanese Fisheries Agency Director is as follows:

(1) To maximize utilization of the fishery resources of the high seas, the resources (placed under abstention) should be released, and the obligation for joint conservation of such resources should be assumed on an equal footing.

(2) Any arrangement which would result in the exclusive utilization of fishery resources by the coastal country in form or in fact must be absolutely opposed.

International (Contd.):

(3) Industry's consistent desire is to abolish the abstention principle in fact and not merely to eliminate it as an expression of term in the text of the Treaty.

The meeting was attended by over 20 persons (Shin Suisan Shimbun Sokuho, September 3, 1964.)

The Japanese Fisheries Agency Director at a press conference on September 1, told reporters that he anticipated difficulties in the Ottawa talks to renegotiate the North Pacific Fisheries Convention. He stated that so long as the contracting parties stand opposed on the interpretation of resources, progress cannot be achieved. He pointed out the importance of guiding the discussions on a practical basis, and for this purpose felt that all parties should submit their substitute proposals (Minato Shimbun, September 2, 1964.)

* * * * *

JAPANESE PRESS REACTION TO TALKS:

The following are reactions printed by the Japanese press to the third round in a series of talks between Canada, Japan, and the United States on the International Convention for the High Seas Fisheries of the North Pacific Ocean. The talks opened in Ottawa, September 9, 1964.

(1) Discriminatory treatment forced upon Japan during the period of occupation must be eliminated. The North Pacific Fishery Treaty and the United States-Japan Aviation Agreement were cited as discriminatory. Attention was being focused on the Ottawa meeting because of similarity in nature to the United States-Japan aviation talks which ended in deadlock when the United States was unwilling to give up special rights and interests obtained during the period of occupation.

(2) Japan should not agree to the principle of historic fishing rights advocated by the United States at the Tokyo meeting in 1963, which is tantamount to monopolistic division of fishery resources by specific countries, i.e., the United States and Canada. The historic rights principle is more objectionable than the principle of abstention because it closes the door indefinitely to Japanese fishermen whereas under the abstention principle the possibility does exist to fish underutilized stocks of fish.

(3) Japan should not approve United States demands for unilateral self-restraint in the fisheries of the Northeastern Pacific.

(4) Unwillingness on the part of the United States to compromise its stand on vested fishery rights, together with the President's announcement to protect United States interests in the North Pacific fisheries, places unnecessary strain on friendly relations between Japan and the United States.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

NEW CONVENTION APPROVED AT CONFERENCE IN COPENHAGEN:

A new Convention for the International Council for the Exploration of the Sea (ICES) was considered and agreed upon by representatives of member Governments of that organization at a conference in Copenhagen, September 7-12, 1964. The Governments represented at the Conference were Belgium, Denmark, Finland, France, the Federal Republic of Germany, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Spain, Sweden, the U.S.S.R., and the United Kingdom.

Neither ICES nor its personnel have had the usual international status of an organization of its type. The new Convention is intended to correct those problems; it describes the purpose of ICES and outlines organizational and financial procedures.

The new Convention shall be open until December 31, 1964, for signature on behalf of the Governments of all States which participate in the work of ICES. The new Convention shall enter into force on July 22 next following the deposit of instruments of ratification or approval by all signatory Governments. Under certain conditions, the new Convention may also be placed in force if at least three-fourths of the signatory Governments deposit instruments of ratification or approval by January 1, 1968.

Following is the text of the new Convention, as agreed upon September 12, 1964:

Convention for the International Council for the Exploration of the Sea

PREAMBLE.

The Governments of the States Parties to this Contion

Having participated in the work of the International Council for the Exploration of the Sea, which was estab-

International (Contd.):

lished at Copenhagen in 1902 as a result of conferences held in Stockholm in 1899 and in Christiania in 1901 and entrusted with the task of carrying out a program of international investigation of the sea

Desiring to provide a new constitution for the aforesaid Council with a view to facilitating the implementation of its program

Have agreed as follows:

ARTICLE 1

It shall be the duty of the International Council for the Exploration of the Sea, hereinafter referred to as the "Council,"

(a) to promote and encourage research and investigations for the study of the sea particularly those related to the living resources thereof;

(b) to draw up programs required for this purpose and to organize in agreement with the Contracting Parties, such research and investigation as may appear necessary;

(c) to publish or otherwise disseminate the results of research and investigations carried out under its auspices or to encourage the publication thereof.

ARTICLE 2

The Council shall be concerned with the Atlantic Ocean and its adjacent seas and primarily concerned with the North Atlantic.

ARTICLE 3

(1) The Council shall be maintained in accordance with the provisions of this Convention.

(2) The seat of the Council shall remain at Copenhagen.

ARTICLE 4

The Council shall seek to establish and maintain working arrangements with other international organizations which have related objectives and cooperate, as far as possible, with them, in particular in the supply of scientific information requested.

ARTICLE 5

The Contracting Parties undertake to furnish to the Council information which will contribute to the purposes of this Convention and can reasonably be made available and, wherever possible, to assist in carrying out the programs of research coordinated by the Council.

ARTICLE 6

(1) Each Contracting Party shall be represented at the Council by not more than two delegates.

(2) A delegate who is not present at a meeting of the Council may be replaced by a substitute who shall have all the powers of the delegate for that meeting.

(3) Each Contracting Party may appoint such experts and advisers as it may determine to assist in the work of the Council.

ARTICLE 7

(1) The Council shall meet in ordinary session once a year. This session shall be held in Copenhagen, unless the Council decides otherwise.

(2) Extraordinary sessions of the Council may be called by the Bureau at such place and time as it may determine and shall be so called on the request of at least one-third of the Contracting Parties.

ARTICLE 8

(1) Each Contracting Party shall have one vote in the Council.

(2) Decisions of the Council shall, except where otherwise in this Convention specially provided, be taken by a simple majority of the votes cast for or against. If there is an even division of votes on any matter which is subject to a simple majority decision, the proposal shall be regarded as rejected.

ARTICLE 9

(1) Subject to the provisions of this Convention, the Council shall draw up its own Rules of Procedure which shall be adopted by a two-thirds majority of the Contracting Parties.

(2) English and French shall be the working languages of the Council.

ARTICLE 10

(1) The Council shall elect from among the delegates its President, a first Vice-President, and a further 5 Vice Presidents. This last number may be augmented by a decision taken by the Council by a two-thirds majority.

(2) The President and the Vice-Presidents shall assume office on the first day of November next following their election, for a term of three years. They are eligible for reelection according to the Rules of Procedure.

(3) On assuming office the President shall cease forthwith to be a delegate.

ARTICLE 11

(1) The President and Vice-Presidents shall together constitute the Bureau of the Council.

(2) The Bureau shall be the Executive Committee of the Council and shall carry out the decisions of the Council, draw up its agenda, and convene its meetings. It shall also prepare the budget. It shall invest the reserve funds and carry out the tasks entrusted to it by the Council. It shall account to the Council for its activities.

ARTICLE 12

There shall be a Consultative Committee, a Finance Committee, and such other committees as the Council may deem necessary for the discharge of its functions with the duties respectively assigned to them in the Rules of Procedure.

International (Contd.):

ARTICLE 13

(1) The Council shall appoint a General Secretary on such terms and to perform such duties as it may determine.

(2) Subject to any general directions of the Council, the Bureau shall appoint such other staff as may be required for the purposes of the Council on such terms and to perform such duties as it may determine.

ARTICLE 14

(1) Each Contracting Party shall pay the expenses of the delegates, experts, and advisers appointed by it, except in so far as the Council may otherwise determine.

(2) The Council shall approve an annual budget of the proposed expenditure of the Council.

(3) In the first and second financial years after this Convention enters into force in accordance with Article 16 of this Convention, the Contracting Parties shall contribute to the expenses of the Council such sums as they respectively contributed or undertook to contribute, in respect of the year preceding the entering into force of this Convention.

(4) In respect of the third and subsequent financial years, the Contracting Parties shall contribute sums calculated in accordance with a scheme to be prepared by the Council and accepted by all the Contracting Parties. This scheme may be modified by the Council with the agreement of all Contracting Parties.

(5) A Government acceding to this Convention shall contribute to the expenses of the Council such sum as may be agreed between that Government and the Council in respect of each financial year until the scheme under paragraph 4 provides for contributions from that Government.

(6) A Contracting Party which has not paid its contribution for two consecutive years shall not enjoy any rights under this Convention until it has fulfilled its financial obligations.

ARTICLE 15

(1) The Council shall enjoy, in the territories of the Contracting Parties, such legal capacity as may be agreed between the Council and the Government of the Contracting Party concerned.

(2) The Council, delegates and experts, the General Secretary, and other officials shall enjoy in the territories of the Contracting Parties such privileges and immunities, necessary for the fulfillment of their functions, as may be agreed between the Council and the Government of the Contracting Party concerned.

ARTICLE 16

(1) This Convention shall be open until 31st December, 1964, for signature on behalf of the Governments of all States which participate in the work of the Council.

(2) This Convention is subject to ratification or approval by the signatory Governments in accordance with their respective constitutional procedures. The instruments of ratification or approval shall be deposited with the Government of Denmark, who will act as the depository Government.

(3) This Convention shall enter into force on the 22nd July next following the deposit of the instruments of ratification or approval by all signatory Governments. If, however, on the 1st January, 1968, all the signatory Governments have not ratified this Convention, but not less than three quarters of the signatory Governments have deposited instruments of ratification or approval, these latter Governments may agree among themselves by special protocol on the date on which this Convention shall enter into force and on other related matters; and in that case this Convention shall enter into force with respect to any other signatory Government that ratifies or approves thereafter, on the date of deposit of its instrument of ratification or approval.

(4) After the entry into force of this Convention in accordance with paragraph 3 of this Article, the Government of any State may apply to accede to this Convention by addressing a written application to the Government of Denmark. It shall be permitted to deposit an instrument of accession with that Government after the approval of the Governments of three quarters of the States which have already deposited their instruments of ratification, approval, or accession has been notified to the Government of Denmark. For any acceding Government this Convention shall enter into force on the date of deposit of its instrument of accession.

ARTICLE 17

At any time after two years from the date on which this Convention has come into force, any Contracting Party may denounce the Convention by means of a notice in writing addressed to the Government of Denmark. Any such notice shall take effect 12 months after the date of its receipt.

ARTICLE 18

When the present Convention comes into force it shall be registered by the depository Government with the Secretariat of the United Nations Organization in accordance with Article 102 of its Charter.

FINAL CLAUSE

IN WITNESS WHEREOF the undersigned being duly authorized have signed the present Convention:

DONE at Copenhagen this twelfth day of September 1964, in the English and French languages, both texts being equally authentic, in a single copy which shall be deposited in the archives of the Government of Denmark who shall forward certified true copies to all signatory and acceding Governments.

Note: See Commercial Fisheries Review, Aug. 1964 p. 51.

INTERNATIONAL CONVENTION ON THE TERRITORIAL SEA AND CONTIGUOUS ZONE

DOMINICAN REPUBLIC RATIFIES CONVENTION:

The instrument of ratification by the Dominican Republic of the Convention on the Ter-

International (Contd.):

ritorial Sea and Contiguous Zone was deposited on August 11, 1964. The ratification entered into force on September 10, 1964.

The Convention was formulated at the United Nations Conference on the Law of the Sea at Geneva on April 29, 1958.

FISH MEAL

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-JUNE 1963-1964:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa. Production and exports of fish meal by FEO countries during January-June 1964 were up substantially from the same period of the previous year.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-June 1963-1964

Country	June		Jan.-June		Total
	1964	1963	1964	1963	1963
	(1,000 Metric Tons)				
Chile	10.5	1/	72.6	1/	1/
Angola	5.3	2.3	29.2	13.8	30.0
Iceland	5.3	3.2	53.0	37.2	99.1
Norway	13.6	5.6	109.0	41.6	102.1
Peru	106.4	84.7	771.4	614.3	1,159.4
So. Africa (including S.-W. Africa)	16.7	16.1	106.9	72.5	198.8
Total	157.8	111.9	1,142.1	779.4	1,589.4

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-June 1963-1964

Country	June		Jan.-June		Total
	1964	1963	1964	1963	1963
	(1,000 Metric Tons)				
Chile	15.7	1/	91.0	1/	1/
Angola	5.8	2.3	30.6	13.1	31.5
Iceland	17.2	4.8	52.9	39.6	87.2
Norway	13.8	19.5	99.8	45.1	132.2
Peru	91.9	98.5	869.6	700.9	1,159.2
So. Africa (including S.-W. Africa)	29.2	32.2	159.2	146.8	238.0
Total	173.6	157.3	1,303.1	945.5	1,648.1

1/Data not available. Chile became a member of FEO at the end of 1963.

During the first 6 months of 1964, Peru accounted for 67.5 percent of total fish-meal exports reported by FEO countries, followed by Norway with 9.5 percent, South Africa with 9.4 percent, Chile with 6.4 percent, Iceland with 4.6 percent, and Angola with 2.6 percent. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 11, 1964.)

* * * * *

WORLD PRODUCTION, JUNE 1964:

World fish meal production in June 1964 held steady at about the same level as in the previous month, according to preliminary data from the International Association of Fish Meal Manufacturers. Compared with the same month in the previous year, world fish meal production in June 1964 was up about 7 percent due mainly to higher output in Chile, Iceland, the United States, and Angola.

World fish meal production in the first 6 months of 1964 was considerably above that in the same period of 1963. The increase was due largely to expanded production in Peru which accounted for about 56 percent of world output during January-June 1964. Higher production during January-June 1964 was also reported in Norway, South Africa, Chile, Iceland, and Angola. The increase was partly offset by lower production in Canada, Denmark, and the United States.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

World Fish Meal Production by Countries, January-June 1963-1964

Country	June		Jan.-June	
	1964	1963	1964	1963
	(Metric Tons)			
Canada	5,533	5,966	21,934	37,910
Denmark	11,776	11,485	41,850	47,444
France	1,100	1,100	6,600	6,600
German Fed. Rep.	5,727	5,821	37,277	38,949
Netherlands	600	300	3,500	2,000
Spain	1/	1/	1/	10,869
Sweden	238	324	3,666	3,107
United Kingdom	6,471	6,656	40,283	38,849
United States	39,548	2/31,620	76,160	2/82,590
Angola	5,795	2,288	2/30,542	13,462
Iceland	17,210	4,754	52,879	39,568
Norway	13,787	19,469	99,835	44,488
Peru	91,904	98,657	869,682	701,507
So. Afr. (incl. S.-W. Africa)	29,316	34,393	163,593	147,997
Belgium	375	375	2,250	2,250
Chile	15,727	5,692	90,980	2/67,797
Morocco	1/	1/	3/ 4,060	1/
Total	245,107	228,900	1,545,091	1,285,387

1/Data not available.
2/Revised.
3/Data available only for January-May 1964.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

BUREAU MEETING OF FISHERIES COMMITTEE HELD:

A Bureau meeting of the Fisheries Committee, Organization for Economic Cooperation and Development (OECD), was held on September 7, 1964, in Paris, France. The purpose of the Bureau meeting was to consider and approve the draft 1965 program on behalf of the full committee. The meeting was attended by the U. S. Regional Fisheries Attache for Europe, United States Embassy, Copenhagen.

FOOD AND AGRICULTURE ORGANIZATION

FISHERY TRAINING CENTER TO BE BUILT IN SOUTH KOREA:

The Food and Agriculture Organization (FAO) is scheduled to build a fishery training center in Pusan, Korea, as part of FAO's five-year technical development assistance pro-

International (Contd.):

gram for the Republic of Korea. The center, to be financed by the U.N. Special Fund, will train 30-40 Korean fishery technicians each year.

Two training vessels (one 200-ton tuna vessel and one 150-ton trawler) will be used by the center, and bid invitations for their construction are expected to be sent to Japanese firms. (Suisancho Nippo, August 22, 1964.)

WHALING

SOVIETS PROPOSE CONFERENCE FOR REVISION OF ANTARCTIC CATCH ALLOCATION:

The Soviet Union is reported to be dissatisfied with the reduction in her whale catch quota for the 19th International Antarctic Whaling Expedition, which begins in December 1964, and proposed this past fall that the three whaling countries--Japan, U.S.S.R., and Norway--hold a conference to revise the present catch allocation.

A catch quota of 8,000 blue-whale units was informally agreed to by Japan, Norway, the Soviet Union, and the Netherlands this year, since the International Whaling Commission, which met in Sandefjord, Norway, in June 1964, failed to reach agreement on the catch quota for the 19th Antarctic Whaling Expedition. The Netherlands, however, sold her whale factoryship Willem Barendsz (26,830 gross tons) and her six-percent international whale catch quota to Japan in August this year. Thus, the number of countries participating in the 1964/65 Antarctic Whaling Expedition was reduced to three. Their catch quotas are: Japan 4,160 blue-whale units (52 percent); Norway 2,240 units (28 percent); Soviet Union 1,600 units (20 percent).

Reportedly, the Soviet Union, which plans to operate 4 fleets, considers her catch share insufficient and seeks a quota increase to around 2,000 blue-whale units. She claims that the catch quota allocation and the observer system adopted in 1962, when there were 5 nations participating in the Antarctic whaling expedition, need to be revised since there are now only 3 nations engaged in whaling. Japan's position is that the 1962 agreement is effective for another two years and it was on that basis that she purchased the Dutch whale factoryship and that factoryship's six-percent international catch quota.

Informed observers in Japan foresee possible Soviet withdrawal from the 1962 agreement. Japan fears that this would disrupt orderly whaling operations and would result in a free-for-all competition, to the detriment of the Antarctic whale resources. Moreover, she considers that such a move by the Soviet Union would render meaningless the high price Japan has paid for the Dutch whale factoryship and her catch quota. Therefore, should a meeting of the three whaling nations be called, as requested by the Soviet Union, Japan is expected to strongly insist upon retaining her 52-percent catch quota. (Suisan Tsushin, September 16; Suisan Keizai Shimbun, September 11, 1964; and other sources.)

Note: See Commercial Fisheries Review, September 1964 p. 54; August 1964 pp. 52, 76; April 1964 pp. 62, 66.

Argentina

FISHERIES TRENDS, 1963-1964:

Landings in 1963: Argentina's commercial fishery landings in 1963 amounted to 122,308 metric tons with an ex-vessel value of 1,170 million pesos (US$8.5 million). Compared with 1962 landings of 92,326 tons valued at 806 million pesos ($7.1 million), the 1963 landings increased 33 percent in quantity and 364 million pesos in value. (A comparison of the U. S. dollar value of the landings for the two years, however, is not a true comparison because the Argentine peso depreciated from an average dollar value of 113.3 pesos in 1962 to an average of 137.8 pesos to the dollar in 1963.)

In 1963 there was expansion in practically all segments of the Argentine fishery industry. It was a peak year for commercial fishing, production of processed fishery products and byproducts, and exports. Continued progress was anticipated for 1964, with estimates of fishery landings placed at about 200,000 tons.

The record commercial fishery landings for 1963 were due to a number of reasons among which are included: (1) the increased capacity and demand of freezing and packing plants, especially for fish fillets for export; (2) the growing demand in the domestic market and abroad for fish meal, and the expanded plant capacity in Mar del Plata for processing it; (3) the reactivation of the anchovy, horse mackerel, and tuna-canning industry; and (4) the increased tonnage of the deep-sea fishing fleet.

Argentina (Contd.):

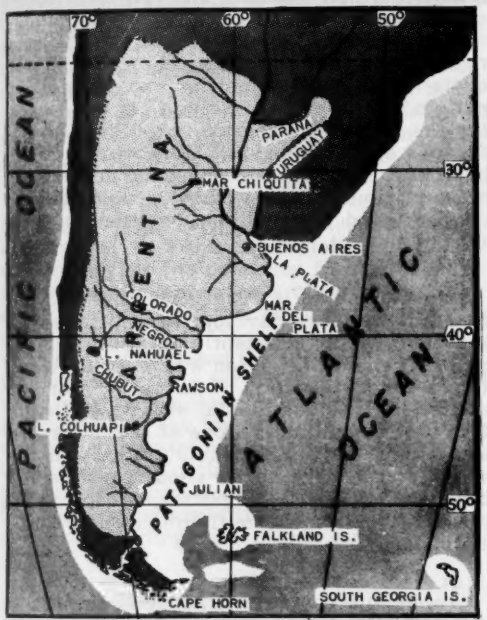


Fig. 1 - Map of Argentina showing extensive Continental Shelf.

Fishing Fleet: The Argentine maritime fishing fleet operating in 1963 consisted of 38 deep-sea trawlers manned by some 450 crew members. During the year those vessels made 1,697 trips and caught 57,280 tons of fish, about 90 percent of which was whiting (merluza). In addition, an inshore coastal fleet of 313 vessels and 25 other small craft with a total of about 1,600 crew members landed 53,039 tons (mostly anchovies and mackerel). The commercial fresh-water fish catch in 1963 amounted to 11,988 tons, mostly shad, smelt, and several other species.

Fig. 2 - Shrimp fishing vessels docked at the Mar del Plata port (Buenos Aires Province).

Utilization of Fishery Catch: Of the total 1964 fishery landings of 122,308 tons, about 43,000 tons went into fresh (iced) fish consumption and the remainder was used for manufacturing processed fishery products and byproducts valued at about 2,399 million pesos ($17.3 million). Included were canned fish and shellfish (13,264 tons); chilled and frozen fish and shellfish (14,852 tons--mostly "whiting," round, dressed, fillets); fish meal (8,055 tons); and fish oil (1,199 tons). Rapid growth was indicated in 1963 in the canning, freezing, and fish-meal-producing segments of the industry.

Fig. 3 - Unloading and packing fish at Mar del Plata.

Fish Meal: Argentina's fish meal production more than doubled in 1963 as compared with the previous year, and another substantial increase is anticipated for 1964. By 1963 there were 5 major fish meal plants operating in Mar del Plata with a total annual capacity of some 12,000 tons, and plans were under way for the construction of 6 more plants. A significant increase in fish meal production for use as poultry feed was expected as a result of two meatless days a week initiated by the government. Also, there have been some experiments in the production of fish flour for human consumption using a freeze-drying process.

Foreign Trade: In 1963 Argentina switched from its former position of net importer of fishery products to that of net exporter. Argentine exports of fishery products and byproducts increased in 1963 to 7,353 tons valued at $1.2 million from 2,532 tons with a value of $391,884 in 1962. An additional 1,458 tons of ocean seaweed (valued at $287,713) was exported in 1963, as compared to 992 tons worth $204,710 in 1962. Argentine imports of fishery products and byproducts in 1963 dropped to to 2,361 tons (value $835,039) from 2,560 metric tons (value $1,022,014) in 1962. The two most important fishery exports in quantity and value were frozen fish--2,768 tons worth

Argentina (Contd.):

$707,841 in 1963, over half of which went to Spain, and fish meal (3,978 tons valued at $396,552), principally to West Germany.

Argentine exports to the United States in 1963 were: 244 tons of frozen fish valued at $116,397 and 1 ton of seaweed valued at $200. In 1962, exports to the United States consisted of 331 tons of frozen fish valued at $133,312, and a very small quantity of canned fish. Argentina imported only a very small quantity of canned fish, caviar, and some other prepared fish products from the United States in 1963 and 1962.

Fig. 4 - Result of a one-hour groundfish drag by Argentine fishing vessel at 120 fathoms--latitude about 42nd south parallel.

Fishery Resources Potential: The Argentine Continental Shelf covers an area of nearly 400,000 square miles. International fishery experts believe it abounds in marine species of commercial value, especially in the zone between parallels 38° and 44° south where the Antarctic and Equatorial currents converge. Argentine Government officials estimate potential fishery yields as high as four million tons annually. Actual exploitation has never measured more than a small fraction of that amount. Nevertheless, Government officials believe that in view of the short distance of the underexploited fisheries resources from Argentine fishing ports, adequate capital investment for expanding the national commercial fishing fleet and industry would place Argentina in a highly advantageous export position. Moreover, it has been argued that, with increased domestic consumption of fish, a corresponding amount of meat products could be diverted into the export market.

Developments in 1964: When in the first half of 1964 there developed a shortage of domestic beef and constantly increasing beef prices, renewed attention was given to Argentina's underutilization of the rich fishery resources off its continental shores, and to the fact that Argentina has one of the lowest average per capita fish consumption rate in the world (2.7 kilograms or about 6 pounds edible weight in 1963). Significant developments affecting the Argentine fishing industry in 1964 were:

1. In June the Argentine Central Bank announced that, as the first step in an overall promotion scheme for the fishing industry, it would make available, through rediscounts to the Bank of the Nation and the Industrial Bank, credits totaling 709 million pesos (about $5.1 million) to finance the construction of fishing trawlers, modernization of the canning and freezing/chilling industry plant and equipment, the acquisition of refrigerated storage facilities and transport, and the installation of modern fish markets. Promotion credits for the fishing industry, especially in the commercialization sector, also were expected to be released by the Provincial Bank of Buenos Aires.

2. As an emergency measure to deal with the short supply of fishing vessels, the Executive Branch issued Decree 4,508/64 of June 17, 1964, establishing one-year authority for Argentine-chartered trawlers under LAFTA-country registry (primarily Peruvian and Chilean) to engage in deep-sea fishing outside Argentina's jurisdictional waters, and according national treatment to fish catches by those vessels. The Argentine Government received offers from Spain, Japan, and Yugoslavia to supply fishing vessels in exchange for Argen-

Argentina (Contd.):

tine meat and agricultural products. However, a Government proposal to modify existing legislation protecting the Argentine shipbuilding industry met with such stiff opposition from the local shipbuilding associations that the project was temporarily shelved. About 15 fishing vessels newly constructed had been expected to be operating in 1964 but only about 7 of them will be completed this year.

3. The presence of foreign fishing fleets (principally Japan and the U.S.S.R., but also of several West European nations, Brazil, and Uruguay) in the deep-sea fishing areas off the Argentine coast was cited by the Executive Branch as partial justification for recently submitting to Congress a draft law which would (1) extend the present 3-mile limit of Argentina's territorial sea to 6 miles, and (2) declare exclusive Argentine sovereignty, and thereby the applicability of Argentine police and customs powers, over the entire contiguous Continental Shelf and epicontinental water, and declare exclusive rights to exploring and exploiting the natural resources (including fish) in that extensive area.

4. Increasing retail fish prices were recently studied by the National and Buenos Aires Municipal authorities. They were termed unjustifiable and the result of a producers' "fish monopoly" in Mar del Plata artificially reducing output and of wholesalers in Buenos Aires exacting enormous profit margins. Price controls were subsequently applied by the government. In order to increase fish consumption, the Buenos Aires Municipality committed itself to construct fish stands in lower-income neighborhoods for the sale of fish at "reasonable" prices.

5. The presentation to the Argentine Congress of an Executive Branch proposal for a comprehensive law promoting and protecting all aspects and sectors of the Argentine fishing industry was expected. (United States Embassy, Buenos Aires, August 20, 1964.)

Note: See Commercial Fisheries Review, July 1964 p. 45; December 1963 p. 54; November 1963 p. 54.

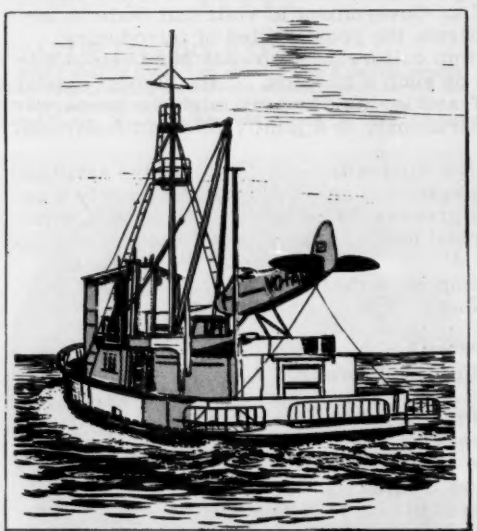
Australia

FACILITIES EXPANDED TO HANDLE INCREASED TUNA CATCH:

To cope with the growing Australian tuna catch, a fishermen's cooperative in South Australia is expanding its activities in Victoria and New South Wales. The cooperative's general manager announced that his organization, together with a Melbourne firm, is taking over a large Melbourne fish cannery. He said they also would build brine tank fish-holding facilities at Eden in New South Wales to allow tuna to be handled in good condition at Eden and transported to Melbourne for canning.

The Melbourne cannery is capable of freezing 100 metric tons of tuna every 36 hours, and will hold in cold storage more than 300 tons. Arrangements have also been made with a public cold-storage plant in Melbourne to store much larger quantities.

The firms involved will form a subsidiary company to operate the Melbourne cannery, handling bluefin tuna from Eden, skipjack from Victoria, and Victorian-caught "salmon" and barracouta.



Stern view of Australian tuna clipper, showing fishing racks and live-bait tanks. Spotting plane fitted with floats on top of tanks.

The brine-tank facilities at Eden will have a capacity of 100 tons. At the end of the New South Wales season, the tanks, which are mo-

Australia (Contd.):

bile, will be transported to Port Lincoln, South Australia, where they will be used to handle the increasing tuna catch there. (Australian Fisheries Newsletter, July 1964.)

* * * * *

JOINT VENTURES WITH JAPANESE IN SHRIMP FARMING AND TUNA FISHING IN AUSTRALIA CONSIDERED:

The shrimp-rearing methods developed in Japan impressed fishery officials of the Western Australian State Government when they visited the island of Shikoku, Japan, in mid-1964. The Western Australian Minister for Fisheries said on his return to Australia that in view of the uncertainty of shrimp stocks at Shark Bay it might be worthwhile to introduce shrimp farming to Western Australia.

At Takamatsu on the island of Shikoku, the Australian officials held discussions with a Japanese scientist who helped develop the technique of shrimp culture. The Japanese scientist said that if it was desired, he could accept an invitation from the Western Australian Government to visit that State to investigate the possibilities of introducing shrimp culture. He already has been to Korea on such a mission. If the project appeared feasible, his company might be prepared to participate in a joint venture in Australia.

The Australian officials said the artificial propagation of shrimp, which is largely a secret process, is being undertaken on a commercial basis on the Japanese island of Shikoku. About 100 tons of artificially-reared shrimp were marketed by the Japanese in 1963.

After hatching, the Japanese cultured shrimp pass through 17 stages in about 28 days before they assume the appearance of shrimp. By that time they are from half to three-quarters of an inch long. At that stage they are sold to farmers who have ponds on the coast where the shrimp are reared to marketable size. The whole process takes slightly less than a year.

The Australian officials also held discussions with a large Japanese fishing company concerning the possibility of developing a joint tuna venture in the Indian Ocean, with Western Australian capital and Japanese vessels, equipment, and if necessary, experienced fishermen. (Australian Fisheries Newsletter, August 1964.)

* * * * *

SHRIMP FISHERY GOOD IN 1964:

Big shrimp landings were reported during May and June 1964 in Queensland, northern New South Wales, and Western Australian waters. Trawlers operating off Moreton Bay, Southport, Tweed Heads, and Brunswick Heads landed about 300,000 pounds of shrimp in a week.

The manager of the Fishermen's Cooperative at Evans Head reported that their intake of shrimp for April-May 1964 was 542,842 pounds compared with 229,336 pounds for the same period in 1963.

The Cooperative's shrimp landings from June 1, 1963, to May 31, 1964, were 920,468 pounds compared with 1,142,034 pounds in the previous year. The manager of the Cooperative said that this slight drop in production was not significant because in 1962/63 trawlers operating south of Evans Head brought in large quantities of small shrimp. During the 1964 season the shrimp were larger and of better quality. As many as 37 vessels were based on Evans Head for the shrimp season, he said.

At Shark Bay, in Western Australia, where the season is later than on the East Coast, a catch of one million pounds for the season was forecast.

Most of Australia's large shrimp are exported to Japan, France, and the United States. The total shrimp catch in 1963 was 12,614,028 pounds, and exports were worth £479,000 (US$1.1 million). (Australian Fisheries Newsletter, July 1964.)

* * * * *

INCREASE IN SCALLOP EXPORTS PLANNED:

With Australian scallop production in 1963/64 substantially increased by the opening up of new beds in Victoria, the need to increase scallop exports became apparent. At the request of the Tasmanian Sea Fisheries Advisory Board, the Fisheries Branch of Australia's Department of Primary Industry undertook a survey of possible overseas markets. Australian Trade Commissioners overseas were asked for the latest "on the spot" market evaluations, and the information they supplied has been incorporated in a full report to be made available soon.

Preliminary investigations on the export potential of Australian scallops were reported most encouraging, and some indication of the general prospects in selected countries follows:

Australia (Contd.):

France: There has been a rapid expansion in the quantity of scallop exports from Australia to France in the past two years. Prospects are excellent for further expansion because consumption of scallops has increased, and local production has not increased at a corresponding rate.

Belgium: Traditionally, Belgium has been supplied by France, although the increased demand has led Belgium to look for new sources of supply. The main outlet is the hotel and restaurant trade where scallops traditionally are an accepted "menu item."

Malaysia: There is a good demand for scallops in the former territories of Malaya and Singapore. In the past four years there have been small sales of Australian scallops in that area, and there appears to be some preference for scallops without roe. There is a considerable demand in Malaya for sun-dried scallops for use in soups and gravies.

Pacific Islands: A small but useful market for scallops in the Pacific Islands has existed for some time and generally is confined to small European communities in the main commercial centers. Australia is the main supplier, and increasing sales appear likely. New Caledonia, with a population of 100,000 (predominantly French) offers the best prospects.

United Kingdom: There is an established consumer demand for scallops in the United Kingdom. The market is supplied mainly by local producers, supplemented by imports. Supplies from overseas are in greatest demand between May and August. There is a preference for live in-shell scallops and fresh scallop meats, but there is a ready market for frozen scallops with low counts per pound. Commonwealth preference arrangements give Australia a good opportunity to expand this market.

Greece: There is a marked preference for seafoods in that country. Scallops, although relatively new to Greece, suit the cooking methods of the inhabitants. Australian scallop were to be featured at a food-tasting exhibition at the Scalonica International Fair this September, and later on in Athens.

Hong Kong: In 1963, Hong Kong imported 26,000 pounds of scallops, but Australia's share in the market was insignificant. Efforts have been made to stimulate sales through major retail outlets but hotels and restaurants appear to offer the best prospects. Hong Kong is a popular tourist resort, and it is expected that the demand for scallops will increase. Prices appear satisfactory, and Australian scallops are acceptable in Hong Kong.

Kenya: Scallops generally are acceptable as a seafood in East Africa by the European community. The United Kingdom was the main source of supply in the past. Frozen scallops with roe on them are acceptable and the prices are favorable. It has been suggested that there could be a good market for frozen scallops with the shells packed separately and for canned scallops because of lack of refrigeration in much of East Africa.

Persian Gulf: The only possible outlets are the small oil-rich States, notably Bahrein and Kuwait, where the demand is confined to hotels and restaurants. Present imports are mostly canned scallops from Japan.

West Germany: Scallops are unknown to most West Germans and consumption is confined to a few gourmets. Supplies are obtained from Canada and Ireland, and there is a preference for "roe-on" scallops. There appears to be a possible market for scallop shells for decorative purposes. Scallop prices quoted appear quite attractive, despite the 13-1/2 percent customs tariff.

United States: The world's largest producer and consumer of scallops is the United States; the bulk of its supplies is normally obtained from the local scallop fishery. Some supplies are received from Canada, Japan and U.S.S.R. There is a strong preference for "all-white" scallops (scallops without roe). There have been scallop gluts in the past, which led in 1961 to a major promotional sales campaign. Small quantities of Australian scallops have been marketed in the United States.

Estimated Australian Exports of Scallop Meats, 1960/61-1963/64

Country of Destination	1963/64	1962/63	1961/62	1960/61
	. .	. (In Pounds) .		. .
France	651,000	70,300	5,200	4,500
Pacific Islands	22,000	12,400	12,800	6,100
Malaysia	5,000	7,700	3,000	8,500
Other Countries	77,000	900	2,400	900
Total	755,000	91,300	23,400	20,000

Lebanon: Scallops have no great appeal to Arab communities who have conservative food tastes, but there is an established market in the tourist hotel and restaurant trade, particularly in Beirut. Preference is for scallops with roe-on and no trade barriers exist at present. British and American armed forces establishments also offer export prospects.

Venezuela: Although scallops have not been imported in the past by that country, there are prospects for developing a market in catering and supermarket establishments. Businessmen have expressed willingness to consider stocking Australian scallops and developing a regular market. (Australian Fisheries Newsletter, August 1964.)

* * * * *

SCALLOP FISHERY EXPANDS:

With a scallop production of more than 5 million pounds (shell weight) during the 1962/63 season, Australia was the fifth largest scallop producer in the world, following the United States, Japan, Canada, and France. In 1963, the United

Fig. 1 - Queensland scallops average six inches in diameter--much larger than the Tasmanian variety. Upper shell of the Queensland scallop.

Australian (Contd.):

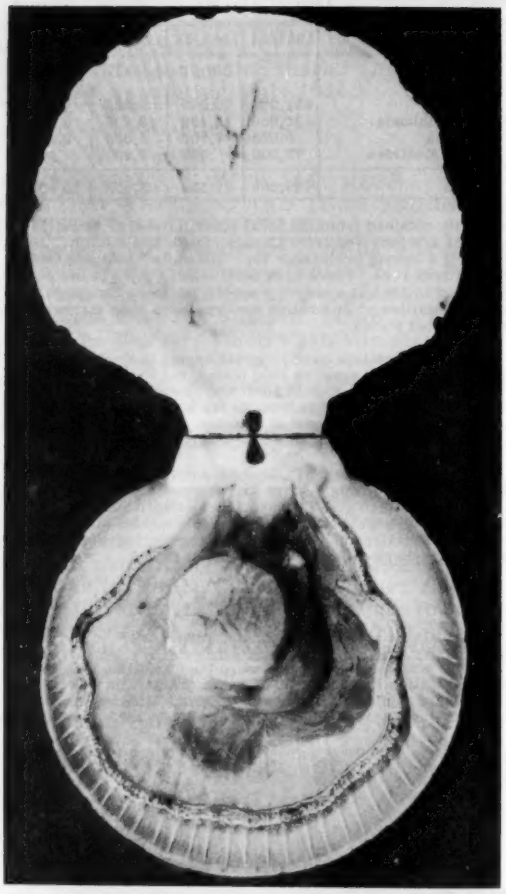


Fig. 2 - A Queensland scallop in its shell, showing the large adductor muscle or meat of the scallop.

States production of scallop meats was about 20 million pounds; in 1962 it was nearly 25 million pounds. The 1962 scallop production of the other countries was (shell weight basis in millions of pounds) Japan 22.3, France 13.7, and Canada 13.9, followed by Australia with 5.1.

Scallop beds exist in a number of regions in Australia, but until recently, commercial production was virtually confined to Tasmania, and to a lesser degree, Queensland. During the 1962/63 season Tasmania produced 90 percent of Australia's total production of a little more than 5 million pounds.

The Tasmanian scallop fishery has a long history extending back before World War I. The greatest expansion was after World War II when the area fished was extended in 1950 from D'Entrecasteaux Channel, near Hobart, to Coles and Norfolk Bays, and subsequently to east coast areas such as Triabunna, Maria Island, St. Helens, and Bicheno.

In 1963 a commercial scallop fishery was established in Victoria, based on beds in Port Phillip Bay, and it has grown

Fig. 3 - A portion of the scallop fishing fleet at the dock in Bundaberg, Queensland.

significantly. In July 1964, 90 vessels were dredging for scallops in Port Phillip Bay. In September 1963, only two vessels were dredging. By February the number of vessels jumped to 40, reached 51 in May, and 90 in June.

April 1964 was the best month for scallop dredging with 42 vessels landing 16,393 bags, each bag containing between 400 and 600 scallops and yielding 17 to 18 pounds of meats. Some of the best individual catches in 1964 were at the rate of 8 to 9 bags an hour (or 4,000 to 4,500 scallops an hour). The best conditioned scallops were taken off Brighton.

Victoria now produces more than 80 percent of Australia's scallop exports which amounted to 755,000 pounds worth about A£180,000 (US$400,000) for the year ended June 30, 1964.

The Tasmanian scallop fishing season opened on May 14, 1964, and the best results were on east coast beds.

The D'Entrecasteaux beds, which for many years were the main source of supply, have declined and because of the poor quality of the scallops are not being fished.

Interest now is centered on the east coast, from Maria Island to Eddystone Point, where a Tasmanian exploratory fishing vessel has assisted by locating new beds and will continue to do so. Although fishing activity has been hampered at times by rough weather, catch rates on east coast beds have been good, and the scallops are of consistently high quality. A fleet of 60 vessels is operating in that area, taking scallops in from 20 to 30 fathoms of water from a clean sea bed. (Australian Fisheries Newsletter, August 1964.)

Note: See Commercial Fisheries Review, October 1964 p. 87.

* * * * *

Australia (Contd.):

EXPORTING PET FOOD TO THE UNITED STATES:

The first Australian export shipment of pet food (prepared from fishery products) was loaded in July 1964 at Port Lincoln, South Australia, for United States delivery. The 300-ton shipment consisted of 25,000 cases valued at about £50,000 (US$111,100). The pet food was packed at a Port Lincoln cannery. (Australian Fisheries Newsletter, August 1964.)

* * * * *

STANDARDS FOR OYSTERS PROPOSED:

In Australia, the New South Wales State Department of Public Health proposes to set bacteriological standards for the sale of oysters for human consumption. It is hoped that the new standards will help open new export markets.

For many years, oyster bacteriological standards have been in effect in various other countries. The main method of cleansing oysters has been ultraviolet light.

When the New South Wales Oyster Farmers' Association was informed of the proposal to establish a bacteriological standard, it sought information from the British Ministry of Agriculture on procedures to adopt in cleansing the oysters. British experts supplied plans and specifications for a modern ultraviolet treatment plant.

An Australian oyster supply firm built a trial plant on Georges River to apply the ultraviolet treatment. After three months of continuous operation, the trial plant was reported to be performing satisfactorily. Treated oysters conformed to a bacteriological standard likely to be established. The treated oysters suffered no impairment of flavor or texture. Oyster treatment costs worked out at about 10 shillings (US$1.11) a bag.

While the plant operated, oystermen were invited to inspect it; they were shown how it worked and given the plans and specifications of the facility.

A newly formed company plans to build another ultraviolet treatment plant in Sydney, Australia.

The annual New South Wales oyster harvest is in excess of 12,000,000 pounds (weight with shell) with a value of £1 million ($2.2 million), according to reports. (Australian Fisheries Newsletter, July 1964.)

Canada

FEDERAL-PROVINCIAL BRITISH COLUMBIA FISHERIES COMMITTEE ESTABLISHED:

The study of fisheries problems on Canada's west coast will be facilitated by a new Canadian Federal-Provincial committee which held its organizational meeting in Nanaimo, British Columbia, August 19, 1964. The initial members of the committee are the Deputy Minister of the British Columbia Department of Recreation and Conservation and the Deputy Minister of Fisheries for Canada. The Deputy Ministers will each name two additional members from Federal and Provincial agencies to bring the committee to full strength.

The next meeting of the committee will be held at Ottawa in early November 1964. Among the problems expected to be brought before the committee at that meeting are those of the West Coast oyster industry, the maintenance and improvement of salmon spawning streams in the face of industrial expansion, and the relationship of sport and commercial fisheries in British Columbia. (Canadian Department of Fisheries, Pacific Area, August 19, 1964.)

* * * * *

FEDERAL-PROVINCIAL ATLANTIC FISHERIES COMMITTEE MEETING IN OTTAWA:

Problems affecting Canada's Atlantic fisheries were discussed at the sixth annual meeting of the Canadian Federal-Provincial Atlantic Fisheries Committee, which is made up of Federal and Provincial deputy ministers with responsibilities for fisheries in the five Canadian Atlantic Provinces. The meeting was opened September 1, 1964, by the Federal Deputy Minister of Fisheries who stressed the value of frank exchanges of views in planning new joint projects.

Subjects discussed at the meeting included Canada's participation in international conservation programs for the Northwest Atlantic; territorial waters and Canada's exclusive fishing zone; fisheries training and marine works in the Atlantic provinces; financial assistance and inspection programs; and marketing organizations. Progress reports were submitted on the proposed Canadian Atlantic Fishing Trawler Conference, and on programs for industrial development. The Committee also received reports from its special sections dealing with salmon, trout, and oysters. (Canadian Department of Fisheries, Ottawa, September 1, 1964.)

* * * * *

NEW CHART OF NOVA SCOTIA FISHING BANKS:

A new type of Canadian chart--a fisheries chart--has been issued by the Canadian Hydrographic Service.

Canada (Contd.):

The new chart, No. 4041, covers the Atlantic Coast banks of Banquereau and Misaine, which lie off Nova Scotia between Scatarie and Sable Islands. It is essentially an accurate detailed picture of the shape and depth of the sea bottom enabling fishermen to select the most favorable areas and banks for fishing. The chart is drawn on a scale of 1:300,000, or about 4 miles to the inch, and is thus 4 times the scale of previous Canadian charts covering the area.

Through the use of a small contour interval, the new chart helps fishermen pick out likely areas to fish and avoid those areas where the bottom is uneven. It illustrates depths primarily by contour lines. The contours are shown as a solid blue line spaced at 10-fathom intervals to a depth of 100 fathoms; at 20-fathom intervals to 200 fathoms; and thereafter at every 100 fathoms to a depth of 1,000 fathoms.

General depths are indicated by three shades of blue. Depths of less than 10 fathoms are shown as a dark blue; the extensive fishing banks, of between 10 and 50 fathoms of water, by a medium blue; and the areas containing over 50 but less than 100 fathoms, by a light blue.

The new chart is available in two versions: L(D6)4041, which shows the decca lattice for the Cabot Strait chain; and 4041-L, which shows the 3 loran rates covering the area. Each version is available (price $2.00 each) either from chart dealers or from the Marine Distribution Office, Canadian Department of Mines and Technical Surveys, Ottawa, Canada.

Ceylon

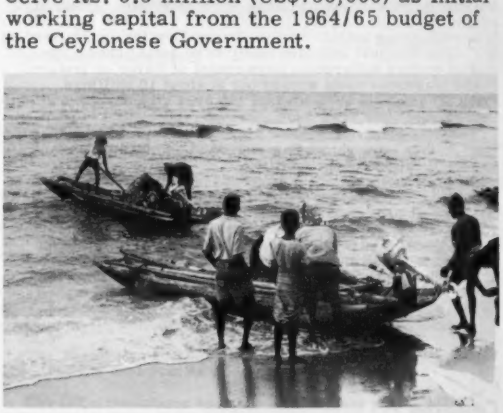
PROPOSED GOVERNMENT FISHERIES CORPORATION MAY LEAD TO FISHERIES EXPANSION:

A proposal to establish a Government-managed Fisheries Corporation was reported in the official Ceylon News-Letter, July 24, 1964. Designed to increase domestic fisheries production, the proposal would also involve a reorganization of the Ceylonese Fisheries Department. All commercial fishing projects of that Department would be transferred to the Fisheries Corporation.

The functions of the Fisheries Corporation would be: (1) commercial fishing, including deep-sea trawling; (2) fish processing, including canning and drying, either directly or through authorized agents; (3) distributing fish through wholesale and retail markets, either directly or through authorized agents; and (4) building and maintaining harbors and shore facilities including cold-storage plants.

Under the proposed reorganization, the functions of the Fisheries Department would be: (1) fisheries regulation under Ceylonese Fisheries Ordinance; (2) fisheries research; (3) fisheries extension work; and (4) miscellaneous service activities such as administration of the vessel loan program, and maintenance of repair facilities and housing for fishermen.

All the assets of the Fisheries Department used or intended for use in commercial activities would be transferred to the Fisheries Corporation. In addition, funds provided for the commercial activities of the Fisheries Department for fiscal years 1963/64 and 1964/65 would be transferred to the Corporation. The Corporation would also receive Rs. 3.5 million (US$736,000) as initial working capital from the 1964/65 budget of the Ceylonese Government.



Ceylonese fishermen launch their shallow log raft teppans. Tests have proved that these craft, which can slide over coral and sand reefs and budge ashore on any beach, can catch more fish if mechanized with outboard engines.

The Fisheries Corporation presumably would take over certain fishing vessels which may be delivered by foreign shipyards. Ceylon has ordered 5 trawlers from Yugoslavia, but because of technical difficulties only 1 may actually be purchased. Ceylon is also trying to buy 10 new tuna fishing vessels abroad.

Ceylon (Contd.):

Ceylonese fishery imports, valued at about Rs. 61 million ($12.8 million) in 1963, are a drain on the country's foreign exchange. That provides a strong incentive to increase domestic fishery landings. The Fisheries Corporation was still in the planning stage when it was mentioned in the Ceylon News-Letter. However, in September 1964 the Ceylonese Minister of Agriculture, Food, and Fisheries was reported to be seeking Cabinet authority for the establishment of the Fisheries Corporation under the State Industrial Corporation Act. If established as planned, it may be necessary for the Fisheries Corporation to obtain advisors from abroad. (United States Embassy, Colombo, September 15, 1964.)

Colombia

FISHERIES TRENDS AND POTENTIAL:

Colombia has access to abundant fishery resources in both the Caribbean Sea and Pacific Ocean, but has not been able to harvest enough fish to meet its domestic requirements. The reasons have been the lack of modern fishing vessels and adequate shore-processing facilities.

The greatest potential for Colombia's commercial fishery is in the waters off the Pacific coast. The Humboldt Current, which produces the environment for the rich Peruvian fishing grounds, is found 200 miles off the coast of Colombia. The intermingling of that cold stream with the warm tropical waters provides an excellent habitat for tuna. Extensive shrimp grounds and large quantities of spiny lobster are found closer to land. The Caribbean fishery harvests a wide variety of tropical fish species such as the snook, snapper, needlefish, yellowfin, shrimp, and sardines.

Colombia has a total of 102 fishing vessels operating on both oceans. The Pacific fleet consists of 53 shrimp vessels and 5 tuna vessels and the Atlantic fleet of 43 general-purpose ships and one shrimp vessel. They are mostly ancient wooden vessels, and both equipment and fishing methods are obsolete.

There are fish-processing plants on both coasts with a concentration of three canneries near the Caribbean ports of Barranquilla and Santa Marta. They process yellowfin, bonito, albacore tuna, and sardines. Plants on the Pacific coast at Buenaventura and Tumaco process tuna, shrimp, and spiny lobster. Fresh fish are sold locally on the coast and iced fish are flown inland and sold as a luxury item in the cities. The only fish meal produced in Colombia is from the waste of canning operations, as the underequipped fishing fleets are able to supply just enough fish to keep the canneries at half capacity.

In Colombia fish are transported to Barranquilla for marketing by canoe down the Magdalena River.

The price of fresh fish in Colombia's inland cities is often double that of beef and other fresh meats. Since the fishing industry enjoys absolute protection from imports, a large internal market could be developed for frozen fishery products if prices were competitive with those of fresh meat. Surface transportation with refrigeration facilities would probably mean a greater demand. There are freezing facilities already at some of the shore locations, but those were not being used.

Both government and private interests have been looking for a way of increasing the country's fishery catches. The vessels being used are usually owner-operated and inefficient, but steel vessels under coordinated management, using electronic techniques and with up-to-date equipment and refrigerated storage, could increase landings significantly.

The Colombian Government has declared the fisheries a basic industry, and has granted tax waivers to fisheries firms. In April 1963, the Second National Fisheries Congress drew up a ten-point program for developing the fishing industry. Its main purpose was to provide a basis for a new Department of Fish-

Colombia (Contd.):

eries, but it also recommended the extension of territorial waters to 200 miles and the restriction of fishing within this area to Colombian vessels. Fishing cooperatives and government credit facilities were also recommended.

It was reported that Colombian fishing companies would welcome joint ventures to provide capital and technical assistance, and Japan has already provided a vessel for fisheries research on the Pacific coast. Also, Colombian shipbuilders were said to be interested in forming licensing arrangements with foreign companies for building new types of fishing vessels and importing modern fish ing gear. The types of vessels needed are in the 50- to 70-foot class, equipped for shrimp fishing, long-lining for tuna, and trawling for sardines and small fish. In line with the Colombian policy of national development, the import of complete vessels would not be permitted. Construction and assembly of component vessel parts in local shipyards would be a primary requirement for any firm wishing to supply equipment.

Colombia exported practically no fishery products before 1949, and in 1962 shipped 942 metric tons to the United States out of a total catch of 42,500 metric tons. Exports now consist mainly of frozen or iced shrimp for the United States market.

The Latin American Free Trade Area (LAFTA) also presents a potential export market for Colombian fishery products. However, most of the LAFTA countries have fisheries equal to those of Colombia, so export success could depend on having facilities for packaging and shipping frozen products.

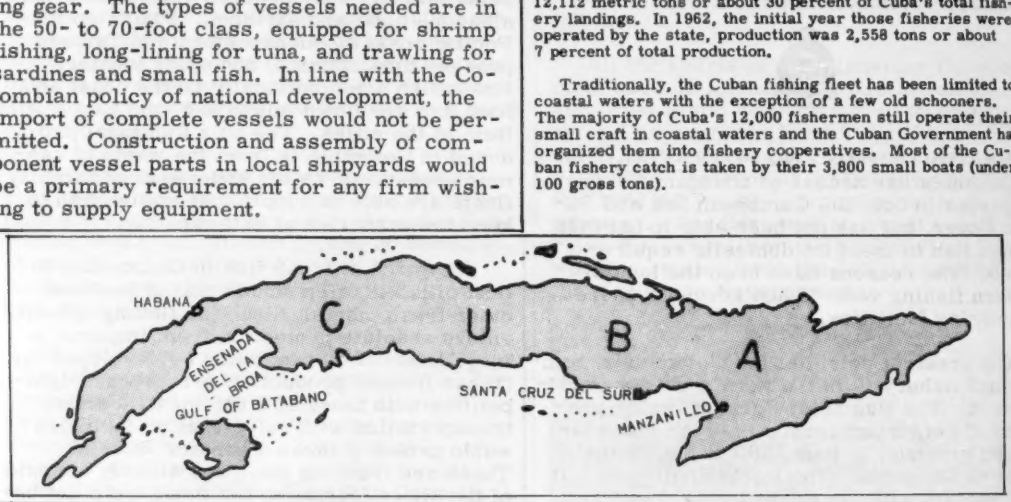
Colombia's natural resources, coupled with a large local market and possibilities for exports (particularly of fresh and frozen shellfish), indicate that the Colombian fishing industry is entering a dynamic phase of development and may soon become an important segment of that country's economy. (Department of Trade and Commerce, Ottawa, August 22, 1964.)

Cuba

CATCH AND FISHING FLEET EXPANDED:

Cuba's fisheries are expanding in the direction of state-operated fishing fleets, according to an official Cuban report. Those fleets include large trawlers, long-line tuna vessels, and other vessels capable of high-seas operations. In 1963, the state-operated fisheries produced a catch of 12,112 metric tons or about 30 percent of Cuba's total fishery landings. In 1962, the initial year those fisheries were operated by the state, production was 2,558 tons or about 7 percent of total production.

Traditionally, the Cuban fishing fleet has been limited to coastal waters with the exception of a few old schooners. The majority of Cuba's 12,000 fishermen still operate their small craft in coastal waters and the Cuban Government has organized them into fishery cooperatives. Most of the Cuban fishery catch is taken by their 3,800 small boats (under 100 gross tons).



Cuba's state-operated fishing fleet consists of 22 vessels: (1) 5 tuna vessels of 350 gross tons which were built in Japan; (2) 15 trawlers (742-gross-ton refrigerated stern trawlers built in East Germany but supplied by the U.S.S.R.);

Cuban Marine Fish Landings by Type of Fishery, 1960-1963

Fishery	1963	1962	1961	1960
	. .	.(Metric Tons).	. .	
Coastal 1/	25,400	27,891	22,361	22,341
Offshore:				
Trawlers	13,624	6,374	4,772	4,449
Long-liners 2/	3,089	1,606	3,298	3,735
Total	3/ 42,113	35,871	30,431	30,525

1/Principally snappers and groupers.
2/Principally skipjack and blackfin tuna.
3/Includes catch of 7,203 metric tons by the 10 medium-size refrigerator stern trawlers supplied under the Cuban-U.S.S.R. Fishing Agreement; 5 additional trawlers were given to Cuba. In 1963, those Havana-based vessels were manned partly by Cubans.

Cuba (Contd.):

and (3) 2 trawlers (medium-size types built in Poland). Ten of the refrigerated stern trawlers still belong to the U.S.S.R. and are used to train Cuban crews. In addition, wooden fishing boats of the Lambda class (97 gross tons) and smaller are included in the production of state-operated fisheries. Tuna long-lining is conducted throughout the Caribbean and off Brazil; trawling is conducted in the North Atlantic between 32° and 43° N. latitude off the Middle Atlantic States and on the Campeche Bank. (Las Pesquerias Cubanas, February 1964.)

Denmark

NEW FISHERIES ATTACHE APPOINTED FOR U. S. AND CANADA:

The position as Danish Fisheries Attache for the United States and Canada, with headquarters in New York City at the Consulate General of Denmark, was filled about November 1, 1964. The position had been vacant since April 1963. The new Fisheries Attache, Erling Hulgaard, was chosen for the post by Denmark's Ministry of Fisheries. His primary duties will be to increase the sale of Danish fishery products in the United States and Canada. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 3, 1964.)

France

SHIPYARDS RECEIVE ORDERS FROM SOVIETS FOR FISHERY FACTORYSHIPS AND FROM SOUTH KOREA FOR TRAWLERS:

An order for three modern fishery factoryships costing a total of US$20.4 million was received in mid-1964 by a shipyard in Nantes, France, from the U.S.S.R. for the Soviet fishing industry.

Each vessel is to be specially equipped for fishing and processing sardines and herring and will have a daily production capacity of 100,000 cans on a 12-hours-a-day basis. The cans will be stocked in separate holds with a total capacity of 70,600 cubic feet (space for 4,750,000 cans). The fish in bulk will be deep-frozen and stocked in a special 26,000-cubic-foot hold. The vessels will also make fish oil and fish meal.

Another order obtained by French shipbuilders at Le Havre is for 48 trawlers destined for South Korea. Another order from South Korea calls for 7 tuna vessels, 3 trawlers, and 1 refrigerated vessel.

It was reported that out of 88 vessels completed by French shipyards in 1963, 47 were fishing vessels. During the same year, 42 fishing vessels were launched in France out of a total of 86, and among the 88 keels laid, 39 were for fishing vessels. (Fish Trades Gazette, August 8, 1964.)

German Federal Republic

NEW FISH-GUTTING MACHINE OFFERED BY FIRM:

A new fish-gutting and beheading machine is being marketed by a West German manufacturer of fish-processing machinery. The new machine is said to be able to handle ocean perch ranging in length from 12 to 22 inches and various other groundfish ranging in length from 14 to 31 inches. The new machine can be adjusted to handle between 25 and 40 fish per minute. It requires only one attendant; his job is to place fish on an infeed conveyor. The machine then automatically heads and guts the fish, removes entrails, and cleans the belly cavity of the fish. The headed and gutted fish leave the machine on an automatic conveyor.

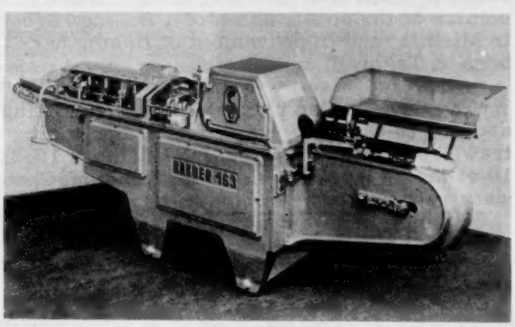


Fig. 1 - A new fish-gutting and beheading machine marketed by a West German manufacturer.

The machine works in a straight line. Its approximate dimensions are length 15 feet, 10 inches; width 3 feet, 7 inches; and maximum height 5 feet, 4 inches. The housings and the frame of the machine are designed to allow an offal conveyor to be placed underneath. The power requirements of the machine are 3 kilowatts.

German Federal Republic (Contd.):

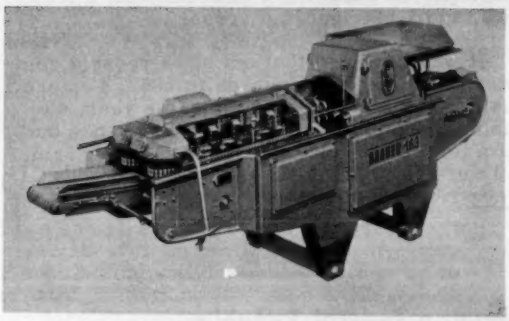


Fig. 2 - Design of the base of the new fish-gutting machine allows for a conveyor to be placed underneath the machine for removal of the offal. The handle on the left hand side permits the tilting and lifting of the upper assembly for better access to the cutting tools for maintenance and cleaning.

The machine is built for heavy duty use, particularly on board fishing vessels. The first production model of the new machine is now in use aboard a German trawler.

Ghana

TECHNICAL FISHERIES ASSISTANCE BY SOVIETS:

The Soviet Union was reported planning to send specialists to Ghana to study the economics of the construction of a fishing harbor in Miemia, and improvement of fishing harbors at Takoradi and Elmina.

The Soviets also planned to send a floating drydock to Ghana for use in repairing their trawlers operating there. In December 1963, 10 of the 17 large trawlers operating off Ghana were reported to be of Soviet registry.

A total of 118 Ghanaian students has already been sent to the Soviet Union for training in fisheries. It was believed they would remain there for 3 to 4 years as they have to learn the language before their fisheries training begins.

A fish cannery was reported being built in Ghana by the Soviets this past summer, and that ground for it had already been broken. (Fishery Attache, United States Embassy, Abidjan, August 13, 1964.)

Note: See Commercial Fisheries Review, March 1964 p. 54.

Greece

ATLANTIC FREEZER-TRAWLER FISHERY TRENDS, JANUARY-JUNE 1964:

During June 1964, a total of 6 Greek freezer-trawlers and 1 refrigerated transport vessel returned from Atlantic operations to home ports with 2,343 metric tons of frozen fish as compared with 1,700 tons of frozen fish delivered in June 1963 by 4 freezer-trawlers and 3 refrigerated vessels.

In January-June 1964, the Greek fleet of freezer-trawlers and carrier vessels operating in the Atlantic landed 9,650 tons of frozen fish in Greek ports, up only 2.7 percent from landings of 9,395 tons in the same period of 1963. In the first half of 1962, the Greek Atlantic fleet delivered 7,481 tons of frozen fish.

Although the total landings in January-June 1964 showed a small gain, average landings by individual vessels were down somewhat from the previous year. (The gain in Atlantic frozen fish landings did not keep pace with the expansion of the Atlantic fleet.) The drop in average landings in 1964 was attributed to a decline in the catch on fishing grounds off Mauritania. In early July 1964, the Greek Atlantic refrigerated fishing fleet (trawlers and transports) included 34 units of which 21 were on active service and 13 were undergoing repair and reconstruction.

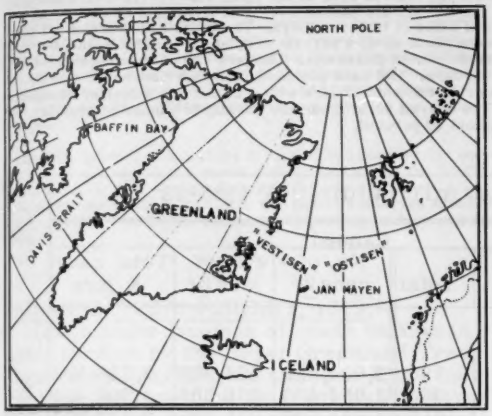
In regard to Government policy affecting Greek Atlantic freezer-trawler operations, the Union of Hellenic Overseas Fishing Enterprises has submitted a detailed memorandum to the Greek Minister of Industry. The memorandum points out that a Greek fleet of 23 active freezer-trawlers could be expected under normal conditions to produce annual landings of 26,000 tons of frozen fish with a value of Dr.300 million (US$10 million). The memorandum then called for the "creation of competitive conditions" for the Atlantic freezer-trawlers. Among other things, it asked for a reduction in the interest rate on fishery loans by Greek commercial banks. It was stated that charges on Greek fishery loans were considerably above average rates in the European Common Market. In the field of marketing, the memorandum referred to the general management of market price control at the Greek Trade Ministry and requested that domestic frozen fish landings be placed on a competitive basis with imported frozen fish. (Alieia, July 1964.)

Greenland

12-MILE FISHING LIMITS MODIFIED TO CONTINUE CERTAIN HISTORIC FISHING RIGHTS OF OTHER COUNTRIES:

When Greenland's fishing limits were extended from 3 to 12 miles on June 1, 1963, certain concessions were made to the historic fishing rights of France, Iceland, Norway, Portugal, Spain, the United Kingdom, and West Germany. Permission has now been granted to fishing vessels registered in those countries to fish with long lines and hand lines and to transfer catches up to Greenland's 3-mile limit until October 31, 1968 (Decree 227 issued by the Danish Ministry for Greenland, July 3, 1964). This represents a 5-year extension of a concession originally granted by Danish Ministry For Greenland Announcement Number 193, May 27, 1963. (Regional Fisher-

Greenland (Contd.):



ies Attache for Europe, United States Embassy, Copenhagen, August 12, 1964.)

Note: See Commercial Fisheries Review, August 1963 p. 88.

* * * * *

HALIBUT FISHERY TRENDS, 1963:

Landings of Greenland halibut in 1963, handled by the Royal Greenland Trading Department (RGTD), totaled 1,906 metric tons as compared with 1,302 tons in 1962. Except for incidental catches in shrimp trawls, Greenland halibut are taken mainly by long line in clay bottoms, often in fjords with glaciers. In winter the long-line fishery is conducted through the ice.

The greater part of the Greenland halibut catch is from the Jakobshavn district which in 1963 accounted for about half the total landings of that species. Most of the halibut catch is handled by the government RGTD which processes it as frozen fillets and salted halibut. Since 1962, more of the halibut catch has been frozen than salted.

Salted Greenland halibut is sliced thinly, colored a salmon shade, lightly smoked, canned in oil and marketed as "solaks" (sea salmon), an imitation smoked salmon. It is reported that only the salted product takes color well. However, the demand has been growing for frozen Greenland halibut that is sliced and uncolored, lightly smoked, and packed in film bags. The United States market for frozen halibut fillets also is being tested. Belgian buyers favor Greenland halibut that is cut to their own specifications. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 26, 1964.)

Table 1 - Greenland Halibut Landings for RGTD by District, 1963

District	Summer Fishery	Winter Fishery	Other	Total
	. . . . .(Metric Tons). . . .			
Julianehaab	4.8	-	-	4.8
Narssaq	25.5	-	-	25.5
Frederikshaab .	36.5	-	-	36.5
Godthaab	12.7	244.0	12.8	269.5
Sukkertoppen . .	45.6	-	-	45.6
Holsteinsborg . .	22.3	-	12.3	34.6
Egedesminde . .	6.4	-	-	6.4
Christianshaab .	50.3	114.5	-	164.8
Jakobshavn . . .	630.0	281.6	7.8	919.4
Umanak	138.6	232.5	15.7	386.8
Upernavik	-	-	12.1	12.1
Total 1963 . . .	972.7	872.6	60.7	1,906.0
Total 1962 . . .	468.3	717.2	116.2	1,301.7

Source: Royal Greenland Trade Department, Copenhagen.

Table 2 - Greenland Halibut (Frozen Fillets and Salted) Exports by RGTD, 1963

Type and Country	Quantity	Value	
	Metric Tons	Kroner	US$
Frozen halibut fillets:			
Belgium	202	661,934	95,980
Denmark	164	406,311	58,915
United States	58	227,734	33,021
West Germany and Sweden	46	127,698	18,517
Total	470	1,423,677	206,433
Salted halibut:			
Denmark	221	846,770	122,782
Belgium	12	32,238	4,675
Total	233	879,008	127,457
Grand total	703	2,302,685	333,890

Note: Values converted on basis of one Danish krone equals US$0.145.
Source: Royal Greenland Trade Department, Copenhagen.

* * * * *

SHRIMP FISHERY TRENDS, 1963-1964:

Greenland's shrimp fishery is its second most important fishery, accounting for 7 percent of the total fishery catch in 1962 and 8 percent in 1963. Its steady growth enabled it to surpass the declining ocean catfish fishery in 1962 and 1963. Shrimp are caught entirely by trawls with a mesh of about 20-22 mm. (25/32 to 55/64 inches) knot to knot, on smooth bottoms in depths of 656 to 1,640 feet, mainly in Disko Bay by 15-30 ton cutters with 60-hp. engines. Significant quantities of Greenland halibut and ocean perch are caught with the shrimp. In 1963, the districts of Christianshaab and Jakobshavn accounted for about 70 percent of the total shrimp landings. Shrimp are caught only from May to November in Disko Bay because of ice during the winter. But in Southwest Greenland the boats usually can fish all winter by shifting grounds.

Table 1 - Greenland Shrimp Catch by District and RGTD Utilization, 1963

District	Processed Shrimp			
	Catch	Canned 1/	Jars	Frozen peeled 2/
	Metric Tons	. . . (Number). . .		Metric Tons
Narssaq	282	552,300	-	-
Sukkertoppen	86	-	-	19
Egedesminde	287	-	-	86
Christianshaab	1,459	2,452,100	623,900	-
Jakobshavn	775	-	-	144
Godhavn	206	-	-	50
Total 1963	3,095	3,004,400	623,900	299
Total 1962	3,360	3,654,400	936,000	237

1/Includes 1.4 million units of machine-peeled shrimp in 2.5- to 7-ounce cans, and about 160,000 units of hand-peeled shrimp in 7-ounce cans.
2/Packed in containers from 2½ ounces to 6.6 pounds.
Note: Contents of cans and jars--80 grams (2⅝-2¾ ounces).
Source: Royal Greenland Trade Department, Copenhagen.

Greenland (Contd.):

Biologists state that overfishing apparently is not a problem in the Greenland shrimp fishery because the trawling grounds are limited compared to the presently unfishable areas in the fjords and along the coasts which would repopulate depleted grounds. Disko Bay trawling grounds are surrounded by very large areas which are not fished. In 1961, trawlers in Disko Bay averaged 880 kilos (1,940 pounds) per day for most of the year. This year (1964) they have been limited to about 300 kilos (661 pounds) per day because of limited plant capacity on shore.

The 1963 shrimp catch was canned and frozen in plants operated by the Royal Greenland Trade Department (RGTD), a part of the Ministry of Greenland, in about equal proportions. Three-year old shrimp may be used by the canneries and freezers but the larger 4- and 5-year old shrimp are preferred. Older year classes are infrequent.

At a typical modern shrimp processing plant in Christianshaab, shrimp trawlers land their catches (90-140 count per pound), only a few hours old and not iced, in 20-kilo (44 pound) boxes. Sorting machines separate the sizes over 6 grams (0.2 oz.) for hand peeling and those between 3 and 6 grams (0.1-0.2 oz.) for machine peeling in United States-built equipment. The former size is cooked and hand-peeled as quickly as possible whereas the latter usually is iced and held for easier machine peeling, uncooked, after storage. For hand peeling, the shrimp are cooked 3-1/2 minutes (automatically timed) in boiling water with 2 percent salt added. Female peelers average about 2 to 2-1/2 kilos (4.4 to 5.5 pounds) an hour, getting about a 25-percent yield. Hand packers average about 100 glass jars an hour and about the same rate for labeled cans of the same size (2-1/2-2-3/4 ounces). The shrimp are packed evenly in alignment on the bottom and sides of the containers. The brine added contains 1 percent citric acid, 4 percent salt, and 2 percent sugar, but no monosodium glutamate. The jars are vacuum-sealed but not the cans. The cans are packed 48 to a fiberboard carton. A carton contains 12 jars with 4 cartons to a master container. The overall yield from raw shrimp to canned product is about 20 percent.

The iced shrimp for machine peeling may be stored for two days and then blanched with live steam on the feeder board of the machine which averages about 250 kilos (550 pounds) of raw shrimp an hour with a yield of 12-18 percent. The yield from raw shrimp to the canned product is about 15 percent which could be increased to 16 percent or more. For use as frozen shrimp the yield is about 20 percent. (Another plant reported 22-23 percent for hand-peeled shrimp). The cans of machine-peeled shrimp are filled by "throw" filling (2-1/2-4-1/2 ounces), filled with a similar brine containing MSG, and sealed without a vacuum.

At the typical plant in Christianshaab, hand-peeled canned shrimp are cooked one hour at 105° C. (221° F.), machine-peeled at the same temperature but for 1-1/2 hours because of the storage time before processing. At some other plants, hand-peeled shrimp are packed in 100-gram (about 3.5-ounce) and one-pound film bags and vacuum-sealed before freezing.

Table 2 - Greenland Shrimp Catch and RGTD Utilization, 1955-63

Year	Catch	Froz. 1/	Canned			No. of cans 2/	No. of jars 2/	Total cans & jars
			Hand-peeled	Machine peeled	Total			
	(Metric Tons)							
1963	3,108	299	188	102	290	3,004,400	623,900	3,628,300
1962	3,362	238	236	132	368	3,654,400	936,000	4,590,400
1961	2,545	125	217	82	299	2,882,000	851,700	3,733,700
1960	1,789	69	175	56	231	2,271,000	612,500	2,883,500
1959	949	34	3/	3/	3/	1,306,200	385,500	1,691,700
1958	759	32	3/	3/	3/	963,700	449,800	1,413,500
1957	670	13	3/	3/	3/	1,025,000	259,800	1,284,800
1956	528	6	3/	3/	3/	800,910	161,000	961,910
1955	564	6	85	-	85	981,300	84,000	1,065,300

1/All peeled except for 30 tons in shell in 1963
2/Number of cans and jars is given in terms of various sizes converted to 80 gram (2⅓- to 2¾-ounce) size.
3/Not available.
Source: Royal Greenland Trade Department, Copenhagen.

Table 3 - Frozen Peeled Shrimp Sold by RGTD in 1963

Country	Qty.	Value	
	Metric Tons	1,000 kr.	US$ 1,000
United Kingdom	103	1,871	272
Denmark	87	1,744	253
France	39	320	46
West Germany	21	413	60
United States	2	28	4
Other countries	37	718	104
Total	289	5,094	739

Table 4 - Canned and Preserved Shrimp Sold by RGTD in 1963

Country	Cans			Jars			Total Value	
	Qty.	Value		Qty.	Value			
	In 1,000	1,000 kr.	US$ 1,000	In 1,000	1,000 kr.	US$ 1,000	1,000 kr.	US$ 1,000
Denmark	1,214	2,545	369	23	41	6	2,586	375
United States	557	701	102	109	246	36	947	138
W. Germany	86	168	24	247	540	78	708	102
United Kingdom	118	212	31	69	159	23	371	54
65 other countries	395	626	91	369	808	117	1,434	208
Totals	2,370	4,252	617	817	1,794	260	6,046	877

Source: Royal Greenland Trade Department, Copenhagen.
Note: Value converted on basis of one Danish krone equals US$0.145.

Greenland (Contd.):

For the future, consideration is being given by shrimp processing plants to methods of removing some shell parts of the shrimp prior to hand-peeling to increase the output. Thought has also been given to holding the shrimp in wells in the vessels, bringing them alive to the plant, pumping them ashore, sorting them quickly by size, and holding them in salt water. Neither of those innovations has been put into use yet.

In 1963, private enterprises in Greenland handled 234 metric tons of shrimp as compared with 3,108 tons by the RGTD. In 1963, RGTD sold shrimp fishery products valued at 11.1 million kroner (US$1.6 million). (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 26, 1964.)

* * * * *

OCEAN CATFISH FISHERY, 1963:

Greenland's landings of ocean catfish in 1963, handled by the Royal Greenland Trade Department (RGTD), amounted to 2,400 metric tons, a 41-percent increase as compared with 1,700 tons landed in the previous year but 46 percent lower than the record 1957 ocean catfish landings of 4,450 tons. Landings of that species continued lower each year since 1957 through 1962 but were a little higher the following year. Biologists believe the decline may be due to depletion of local stocks near the coast.

Ocean catfish are caught along the West Greenland coast as far north as Upernavik and to Angmagssalik in East Greenland. The most important fishery is off Sukkertoppen where ocean catfish are fished by long line in depths of about 984 to 1,312 feet inside Little Hellefiske Bank. There is a smaller fishery in the Egedesminde district. Spotted, striped, and blue ocean catfish are found in Greenland waters but only the spotted species is of commercial importance. The blue species has watery meat which makes it unsuitable as a food fish, and the striped species (Anarhichas lupus L.) is smaller than the spotted species and less abundant.

Greenland's catch of ocean catfish is processed into fillets and frozen for export as it is highly favored as an export item.

Private enterprises in Greenland utilized 358 tons of ocean catfish (including some ocean perch) in 1963 as compared with 2,400 tons handled by the Government RGTD. In 1963 the RGTD exported 459 tons of ocean catfish fillets (value US$246,000) to the United States and 10 tons (value $5,000) to Sweden. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 26, 1964.)

Iceland

EXPORTS OF FISHERY PRODUCTS, JANUARY-JUNE 1964:

During January-June 1964, there was an increase in exports of frozen salted fish (uncured), frozen fish fillets, cod-liver oil, and fish meal as compared with the same period in 1963, according to the Icelandic periodical Hagtidindi, July 1964. Exports of herring on ice, frozen herring, and herring oil showed a considerable decrease in the first 6 months of 1964.

Icelandic Fishery Exports, January-June 1964 with Comparisons

Product	Jan.-June 1964			Jan.-June 1963		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 kr.	US$ 1,000	Metric Tons	1,000 kr.	US$ 1,000
Salted fish, dried	640	16,569	384	1,411	28,467	660
Salted fish, uncured	19,121	298,719	6,930	14,446	185,887	4,313
Salted fish fillets	846	11,821	274	767	8,877	206
Wings, salted	1,130	14,270	331	1,402	17,499	406
Stockfish	4,501	125,157	2,904	3,034	81,538	1,892
Herring on ice	18	140	3	7,224	23,417	543
Other fish on ice	16,847	96,275	2,234	17,753	90,360	2,096
Herring, frozen	13,106	77,806	1,805	24,212	131,593	3,053
Other frozen fish, whole	1,551	14,408	334	1,612	18,698	434
Frozen fish fillets	30,987	617,250	14,320	26,668	522,645	12,125
Shrimp and lobster, frozen	372	34,276	795	180	17,876	415
Roes, frozen	1,030	17,415	404	659	10,497	244
Canned fish	149	8,534	198	105	6,622	154
Cod-liver oil	6,365	56,670	1,315	4,609	31,749	737
Lumpfish roes, salted	383	9,526	221	218	3,568	83
Other roes for food, salted	2,606	39,053	906	3,176	44,919	1,042
Roes for bait, salted	1,675	14,013	325	974	7,203	167
Herring, salted	14,066	140,255	3,254	17,520	166,658	3,866
Herring oil	9,492	73,555	1,706	15,614	62,717	1,455
Ocean perch oil	28	188	4	116	515	12
Whale oil	2,101	18,675	433	2,035	11,042	256
Fish meal	22,212	138,697	3,218	5,614	33,294	772
Herring meal	31,640	178,138	4,133	32,368	198,149	4,597
Ocean perch meal	255	1,475	34	956	4,479	104
Wastes of fish, frozen	1,919	7,142	166	1,095	3,295	76
Liver meal	307	2,032	47	283	1,970	46
Lobster and shrimp meal	87	346	8	-	-	-
Whale meal	780	4,315	100	100	558	13
Whale meat, frozen	522	4,201	97	838	5,887	137

Note: Values converted at rate of 1 krona equals 2.32 U.S. cents.

* * * * *

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-APRIL 1964:

Species	Jan.-April	
	1964	1963
	. . .(Metric Tons) . . .	
Cod	219,196	142,221
Haddock	22,983	20,883
Saithe	11,515	4,663
Ling	2,636	3,432
Wolffish (catfish) .	5,698	9,111
Cusk	2,665	4,041
Ocean perch	5,049	7,025
Halibut	280	340
Herring	65,028	75,365
Shrimp	89	349
Capelin	8,640	1,077
Other	1,504	1,358
Total	345,283	269,865

Note: Except for herring which are landed round, all fish are drawn weight.
Source: Aegir, July 15, 1964.

* * * * *

Iceland (Contd.):

UTILIZATION OF FISHERY PRODUCTS, JANUARY-APRIL 1964:

How Utilized	January-April	
	1964	1963
	(Metric Tons)	
Herring[1] for:		
Oil and meal	52,300	51,637
Freezing	9,497	11,925
Salting	3,231	6,348
Fresh on ice	-	5,456
Groundfish[2] for:		
Fresh on ice	15,180	14,410
Freezing and filleting	109,003	83,080
Salting	72,580	47,731
Stockfish (dried unsalted)	68,610	41,881
Canning	24	35
Home consumption	4,838	4,919
Oil and meal	1,291	1,013
Capelin for:		
Freezing	133	188
Oil and meal	8,507	889
Shrimp for:		
Freezing	53	267
Canning	36	82
Lobster for:		
Fresh on ice	-	2
Freezing	-	2
Total production	345,283	269,865

1/Whole fish.
2/Drawn fish.
Source: Aegir, July 15, 1964.

* * * * *

LOBSTER PRODUCTS EXPORTS INCREASED:

Iceland is exporting increased quantities of its small lobsters which are fished profitably during the summer only in specific sea areas. The Icelandic Freezing Plants Corporation sells them quick-frozen as "lobster tails" in the United States, usually with the shell, or as "lobster meat" without the shell. In Great Britain, Switzerland, and Italy they are best known as "scampi" or "prawns," and are sold there in a similar way as in the United States.

The packs in which the Icelandic Freezing Plants Corporation exports lobster to those markets are 1-lb., 5-lbs., and 12-lbs. Although most of the Icelandic production goes to various institutions, lobster is increasing in popularity on the normal consumer market. (Iceland Review, Reykjavik, vol. 2, no. 2, 1964.)

* * * * *

NEW TYPE LOBSTER PRODUCT AVAILABLE:

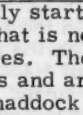
A new type of lobster pack called "boil-in-the-bag lobster" is now available from the Export Branch of the Federation of Icelandic Cooperatives. The lobster is first quick-frozen in airtight cryovac bags and then boiled in the bags, so that it loses none of its delicate flavor or juices. The quality of the lobster is thus preserved.

The new product is available in 225-gram-packs (8-oz.) and is intended both for the United States and the European markets. It was developed in the research department of the Icelandic Federation at Hafnarfjorour in Iceland, which also was responsible for the new processing of Icelandic eel and the production of spiced roes. (Iceland Review, Reykjavik, vol. 2, no. 2, 1964.)

* * * * *

FIRST FISH SAUSAGES PRODUCED:

Iceland recently started making fish sausages, a product that is now available in Icelandic retail stores. They look exactly like meat frankfurters and are lightly smoked, but are made out of haddock and lumpsucker. It is planned to produce the fish sausages for the Icelandic home market only, but later and, depending on their acceptance, it is hoped they may become an export item.



Ireland

FISH MEAL FACTORY PLANNED FOR EAST COAST:

Negotiations for the construction of a new fish meal plant on the east coast of Ireland were reported to be well advanced in the fall of 1964. Fishermen in the area should be able to increase their earnings substantially. Raw material for the plant will be furnished by the recently discovered stocks of sprat and sand eel on the east coast. The plant will also take trash fish, which are now dumped in large quantities.

Export markets are reported to have been negotiated for the planned firm, and the growing poultry industry in Europe is expected to create a continuing demand for Irish fish meal. (The Irish Skipper, September 1964.)

Japan

ALBACORE AND YELLOWFIN EXPORT PRICES:

The export price of Japanese albacore shipped direct from Japan proper to the United States as of early September 1964 was US$370 a short ton c. & f., but sales were reported slow due to lower offers of $360-365 a short ton made by many United States buyers. The ex-vessel albacore price in Japan was holding at around 122 yen a kilogram ($308 a short ton).

Yellowfin tuna exports direct from Japan were transacted at $350 c. & f. a short ton. (Suisan Tsushin, September 8, 1964.)

* * * * *

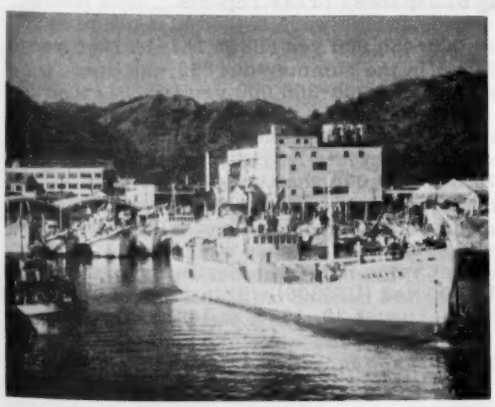
FROZEN TUNA SALES TO U. S. CONTINUED SLOW, JULY-AUGUST 1964:

Japanese frozen tuna exports to the United States were slow during July and August 1964. The slowdown in sales was attributed to good albacore landings by United States fishermen in southern California. Prices of Japanese albacore exported to the United States in July and August declined from US$330 to around US$300 a short ton, f.o.b. Japan. (Suisancho Nippo, August 31, 1964.)

* * * * *

ATLANTIC TUNA FISHERY, AUGUST 1964:

The Japanese Atlantic Ocean albacore fishery was leveling off as of late August 1964 and big-eyed tuna were again dominating the tuna landings, particularly in the fishing grounds off the coast of West Africa. Increased yellowfin catches were also observed. Bluefin, which were taken in considerable quantities during May and June, virtually disappeared during the mid-summer months and were expected to show up again during September and October.



Japanese tuna long-liner.

The frozen tuna market in Italy was reported to be holding steady, but Japanese traders were again showing some concern over the increasing big-eyed catch. The price of Atlantic albacore exports to the United States in August 1964 was US$310 a short ton, f.o.b. Las Palmas. (Suisan Tsushin, August 25, 1964.)

* * * * *

TUNA RESOURCES IN EASTERN PACIFIC TO BE SURVEYED BY RESEARCH VESSEL:

The Japanese Fisheries Agency on September 7, 1964, announced the fiscal year 1964 (April 1964-March 1965) tuna resource investigation program to be conducted by its research vessel Shoyo Maru (604 gross tons). The purpose of the cruise is to cooperate in the tuna resource investigations of the Inter-American Tropical Tuna Commission (IATTC) as well as to expand Japanese data on tuna resources. This year the Shoyo Maru will conduct a close study of the yellowfin tuna resources in the eastern Pacific Ocean.

Japanese research vessel Shoyo Maru to survey tuna resources in Eastern Pacific.

The Shoyo Maru cruise plans are as follows:

1. Three researchers from the Nankai Regional Fisheries Laboratory and the Fisheries Agency, and one assistant from a Japanese university accompanied the cruise.

2. The ship departed from Japan on October 10, 1964, on a 5-months cruise and will return home on March 15, 1965. During the cruise, she is scheduled to call at Pago Pago,

Japan (Contd.):

American Samoa; Papeete, Tahiti Islands; Valparaiso, Chile; Balboa, Panama Canal Zone; San Diego, Calif.; and Honolulu, Hawaii.

3. Research objectives are: (a) study geographical distribution, abundance, catch quantity by fishing ground and hook rate of important fish; (b) conduct gear tests; (c) collect samples of juvenile fish in the central Pacific Ocean area extending 20 degrees north and south of the equator; (d) conduct oceanographic and meteorological studies; (e) conduct biological studies (collect measurements on lengths and weights of fish, study feeding habits, collect data on gonad weights, conduct experiments on artificial fertilization, and collect specimens); (f) tag and release fish; (g) study fishing conditions at ports of call; (h) transmit fishing condition reports daily to Misaki, Shimizu, and Yaizu radio stations. (Suisan Tsushin, September 8, 1964.)

* * * * *

STUDY OF RESOURCE MANAGEMENT PROBLEMS CONFRONTING TUNA FISHING INDUSTRY:

The Japan Federation of Tuna Fishermen's Cooperative Association is studying ways and means of coping with the increasing resource management problems confronting the tuna fishing industry. Opinion is gaining ground within the Association that the scale of vessel operations should be reduced in order to resolve those problems and stabilize the industry.

Yellowfin tuna about to be transferred to a Japanese tuna mothership.

Earlier, the Association had planned to develop a long-range plan in line with the Government's policy of renewing all tuna vessel licenses by 1967. However, in view of the declining tuna resources and worsening labor problems, the Association realized the necessity of developing measures to cope with those immediate problems in order to save vessel owners from possible bankruptcy. Preliminary statistical studies on tuna resources conducted by Professor Morigoro Tauchi (lecturer at the Tokyo Fisheries College) for the Association indicated that overfishing of adult fish in the Atlantic Ocean has seriously threatened reproduction in that ocean. His studies covering other regions can be expected to produce similar findings.

The Association began to study the tuna resource and management problems two years ago at the time when the Fisheries Agency was considering authorizing an additional 20,000 tons of vessel tonnage for the tuna fishing fleet. The Association at that time took the position that it would be unwise to expand the tuna fleet, but the Agency nevertheless proceeded to license the additional tonnage (primarily to permit fishing vessels withdrawn from other fisheries to enter the tuna fishery). Since that time the awareness of resource problems has begun to grow rapidly among tuna vessel owners. (Nihon Suisan Shimbun, August 17, 1964.)

* * * * *

MARKET VALUE OF TUNA FISHING LICENSES CONTINUES TO FALL:

The market value of tuna fishing licenses traded in Japan continues to decline, according to Japanese press reports. Tuna fishing licenses, which were traded at a premium of 420,000-460,000 yen (US$1,167-1,278) a vessel ton in the summer of 1963, declined in value to 350,000-360,000 yen (US$972-1,000) a ton in June 1964, and subsequently continued to drop, due to depressed business conditions. Quotations in late August were given as 170,000-200,000 yen (US$472-556), and even at $472, buyers were making payments in promissory notes payable in 120 days. The opinion among Japanese observers is that the market value may even decline to around 110,000 yen (US$306) within 1964. (Suisancho Nippo, August 29, 1964, and other sources.)

* * * * *

Japan (Contd.):

DRIFTWOOD RELEASED BY TUNA VESSELS RECOVERED:

The Tokai University Fisheries Research Laboratory in Shizuoka, Japan, has recovered 6 of about 200 planks and logs released by Japanese fishing vessels in June 1964 off southeast Formosa in an experiment to study the association of tuna with driftwood. The timbers were transported northward by the Kuroshio Current and were recovered on the beaches of Okinawa, Kagoshima (southern Kyushu), and Chiba Peninsula (south of Tokyo).

Examination showed traces of a considerable number of organisms having become attached to the driftwood, revealing the fact that organisms attach themselves to floating objects at sea within a short period of time. However, since all 6 wooden pieces had drifted ashore by the time they were found, the extent of pursuit of those objects by tuna, if any, could not be determined. (Suisan Keizai Shimbun, August 14, 1964.)

* * * * *

MOTHERSHIP FIRMS TO CONSIGN SALES OF PACK OF ALASKA PINK SALMON TO LAND-BASED PACKERS ASSOCIATION:

The four salmon mothership firms, which had purchased fresh pink salmon from Alaska fishermen, had refused to sell any of the fish to the land-based Hokkaido Salmon Packers Association. But those firms have accepted the Fisheries Agency's proposal that they consign the sales of the canned salmon packed from Alaskan pinks to that Association. Under the Agency's proposal, the Association would handle the export sales of the canned pink salmon at an assessment of six yen per case (US$0.017) to the mothership firms. Normally, the Association assesses a fee of 10 yen per case ($0.028), but it is understood that the reduced assessment will be an exceptional case applicable only to this year's sale.

The Association has abandoned its attempt to buy any Alaska pink salmon from the mothership firms. (Suisan Tsushin, September 2, 1964.)

* * * * *

HALIBUT LANDINGS AND EXPORTS, 1958-63:

Japan's total halibut landings of 9,688 metric tons in 1963 were down 2 percent from the previous year and dropped 15 percent from the record 1961 halibut landings. During the 1963 North Pacific halibut fishing season, Japan took 3.7 million pounds from the Triangle Area of the eastern Bering Sea. The 1963 quota for that area was set at 11 million pounds with the United States, Canada, and Japan fishing in the area.

Japan exported about 16 percent of its 1963 halibut landings. Most of those exports, valued at US$1.1 million, were about equally divided between the United States and the United Kingdom, with a smaller quantity going to West Germany. (Fisheries Attache, United States Embassy, Tokyo, September 9, 1964.)

Japanese Landings and Exports of Halibut, 1958-1963

Country	1963		1962		1961		1960		1959		1958	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000
Production	9,688	-	8,899	-	11,416	-	6,931	-	1,240	-	1,270	-
	Short Ton		Short Ton		Short Ton		Short Ton		Short Ton		Short Ton	
Exports:												
United States	785	511,305	2,160	1,713,000	990	568,000	411	260,200	225	99,000	18	10,000
United Kingdom	779	443,372	210	84,800	156	85,000	-	-	124	40,100	8	2,500
Australia	2	1,340	-	-	-	-	-	-	1	300	-	-
Canada	-	-	-	-	-	-	-	-	2	900	-	-
West Germany	154	93,669	-	-	-	-	-	-	-	-	-	-
Netherlands	6	3,505	-	-	-	-	-	-	-	-	-	-
Other Countries	1	440	-	-	-	-	4	2,000	-	-	-	-
Total	1,727	1,053,631	2,370	1,797,800	1,146	653,000	415	262,200	352	140,300	26	12,500

* * * * *

JAPANESE VIEWS ON NEW LAW PROHIBITING FISHING IN U. S. TERRITORIAL WATERS BY FOREIGN VESSELS:

On May 20, 1964, President Johnson signed into law S. 1988 (introduced in the Senate

Japan (Contd.):

by Senator Bartlett), an act to prohibit fishing in the territorial waters of the United States and in certain other areas by vessels other than vessels of the United States and by persons other than United States nationals or inhabitants--P. L. 88-308. In signing the bill the President said, "This law fills a long-standing need for legislation to prevent foreign fishing vessels, which in recent years have appeared off our coast in increasing numbers, from fishing in our territorial waters... ."

Japanese views on P. L. 88-308 were contained in an article written by Kunio Yonezawa, First Ocean Section of Japan's Fishery Agency, which was published this past June in the Japanese periodical Suisan Jiho. A translation of that article follows:

"The Bartlett bill 'to prohibit fishing in the territorial waters of the United States and in certain other areas by foreign vessels and by persons in charge of such vessels' was signed into law by the President on May 20. Moreover, the Convention on the Continental Shelf, which is closely related to the so-called Bartlett Law, came into effect on June 10 following ratification by the United Kingdom (on May 10).

"Japan, fearing that the implementation of the 'Bartlett Law' would adversely affect the Bristol Bay king crab fishery which Japan has been conducting since 1930, conferred on this matter with the U. S. State Department through Ambassador Takeuchi. As a result, confirmation was made in the President's statement that the new law will not establish any new rights for the United States, and that, in its enforcement, full consideration will be given to Japan's long-established king crab fishery. Japan was thereby assured that her existing king crab fishery would be maintained. Of course, Japan had repeatedly indicated to the United States that she (Japan) was neither a signatory nor a participant to the Continental Shelf Convention so that, from the standpoint of international law, she was not bound by the Convention provisions embodied in that law. However, examples such as the 200-mile territorial sea limits imposed by Latin American countries, the Rhee Line, and the 1962 Shelikof Strait incident (involving seizure by the Alaskan Government of Japanese vessels fishing for herring on the high seas of that Strait and indictment of responsible persons) show that unilateral acts not sanctioned under international laws can actually eliminate foreign vessel operations through application of force. This is why Japan is so gravely concerned about the Bartlett Law and the Convention on the Continental Shelf.

"The Convention on the Continental Shelf is one of the Four Conventions on the Law of the Sea, and was drafted at the First Law of the Sea Conference held in Geneva in 1958. It defines the jurisdictional rights of coastal states with respect to natural resources and living resources of the continental shelf, and among the four conventions, it was the second to come into effect, next to the Convention on the Law of the High Seas. Japan, as mentioned earlier, is not a signatory to that Convention.

"The principal signatories are the United Kingdom, the United States, the Soviet Union, Australia, and Denmark. Latin American countries, which also assert their sovereignty over superadjacent waters of the continental shelf, are not signatories, since the Convention does not recognize jurisdiction of the coastal state over superadjacent waters. The United States, by means of the Truman Proclamation of 1945 and the Outer Continental Shelf Lands Act of 1953, has been asserting her rights over the continental shelf natural resources.

"The 'Bartlett Law' is intended to halt Cuban and other foreign vessel operations within U. S. territorial waters, as well as to check the expansion of Japanese and Soviet king crab operations. The bill was submitted to the United States Congress on August 6, 1963, under the joint signatures of such influential senators as Bartlett (Alaska), Jackson (Washington), Magnuson (Washington), and Kennedy (Massachusetts). It was designed to prohibit fishing by foreign vessels in the territorial waters of the United States or within any waters in which the United States has the same rights with respect to fisheries as it has in its territorial waters, and prohibits the taking of any continental shelf fishery resources which appertains to the United States. It further provides for penalties of up to $10,000, imprisonment of up to one year, or both, and seizure of fishing gear.

"The Act defines the continental shelf and the shelf fishery resource in the same manner as set forth in the Continental Shelf Convention. The continental shelf is defined as 'the seabed and subsoil of the submarine areas to a depth of 200 meters or, beyond that limit, to where the depth of the superadjacent waters admits of the exploitation of the natural resource of the said areas,' and the continental shelf fishery resources are defined as 'living organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed.' Concerning the listing of species belonging to the continental shelf fishery resources, the Secretary of the Interior, in consultation with the Secretary of State, will publish in the Federal Register a list of species to which this law applies.

"The discussion on the continental shelf resources evoked heated debates at the first Law of the Sea Conference held in 1958. The original draft contained the provision 'swimming fish and shellfish are not included,' and thus left little room for argument. In the deliberations on the final draft, however, a proposal was made to delete that provision. The motion was voted down by the Fourth Committee but, following deliberations, it was approved at the plenary meeting, thus keeping alive, among the nations, a needless source of argument over the application of the Convention, as was feared by the British delegate.

"The exclusion of the provision, 'swimming fish and shellfish are not included,' led to the development of two views on shellfish. (Incidentally, the United States, which opposed the deletion of that provision when the final draft was put to a vote by the Fourth Committee, voted in favor of deletion at the plenary session.) One view, shared by the United States and the Soviet Union, is that shellfish naturally are to be included in the definition of shelf resource. The other view (supported by the majority of nations at the Law of the Sea Conference) is that the continental shelf resource should be confined to those organisms in very close contact with the seabed, which naturally would not include shellfish and other swimming creatures. As was pointed out by the Australian delegate, who offered the definition of the

Japan (Contd.);

continental shelf resource, and by Garcia Amador, chairman of the deliberation committee, the provision was deleted for no other reason than it was 'repetitious of the text and therefore considered unnecesary.'

"The definition of the continental shelf and living resources of the shelf was jointly proposed by Australia, Ceylon, Malaya, Norway, and the United Kingdom (and later supported by the United States and the Soviet Union). However, at that time Ceylon stated that the 'living resources dwelling on the seabed can be classified into three categories: (1) those which are absolutely immobile on the seabed; (2) those which do not move more than 2-3 feet; and (3) those which move over a considerable distance (fish and shellfish), and the limit of inclusion of shelf resources is somewhere between categories 2 and 3.' Thus, the provision was deleted at the plenary meeting.

"Judging from the opinions of the various nations, as described above, as well as from the circumstances surrounding the deletion of the provision, i.e., 'swimming fish and shellfish are not included,' and moreover, considering the fact that the majority of the nations, which had agreed to retain the provision at the drafting committee meeting, had voted for its deletion at the plenary session, it seems reasonable to assume that the purport of the original draft remained unchanged. This has been pointed out by McDougal and Burke (1962), distinguisned U.S. experts on international law, in their book entitled, 'The Public Order of the Oceans.' In it, they state that 'the thinking at the Law of the Sea Conference was that the living organisms that cannot move without constant contact with the seabed include only those organisms which cannot move more than a few inches to a few feet from their stationary positions on the seabed.' Thus, in view of the substance of the definition and the circumstances surrounding the deletion of the provision, the view that shellfish are not included in the shelf resource was shared by the majority of the countries (including Japan).

"In spite of this preponderance of opinion, the United States Government, in implementing the 'Bartlett Law,' plans to designate king crab as a species of the continental shelf resource under Article 5-a of that law. This perhaps is natural when viewed from the standpoint that the aim of the law was to have the United States retain exclusive rights to the king crab resource in the Gulf of Alaska. At the Senate public hearings on the Bartlett bill, officials of the U. S. State and Interior Departments testified, on the basis of the interpretation provided by experts of the Smithsonian Institute, that the king crab, which do not have swimming legs, belong to the shelf resource, whereas the blue crab and shrimp (including lobsters) do not fall within that category. However, even some Americans are concerned over this interpretation, which they feel will not necessarily bring about only beneficial results to their country. For example, the Astorian, a daily published in Oregon, stated as follows in its May 22 editorial: 'The paramount question is whether the United States will gain much or lose much from implementing this Act. In effect, this Act will be lending support to those countries which are seeking to extend their fishing rights to the superadjacent waters of the continental shelf.'

"Ghana was recently reported as having extended her territorial waters to a distance of 130 miles offshore. The shrimp problems in the Gulf of Mexico and the extension of territorial sea limits by Latin American countries are unlikely to strengthen the U. S. position as a result of her recent legislation, although they could weaken her position.

"The shrimp fishery in the Gulf of Mexico is one of the most important fisheries of the United States, yielding over $30-40 million annually. About one-third of the Gulf shrimp is taken from waters of the continental shelf off Mexico. During deliberations on the Bartlett bill, Senator Bartlett is said to have explained to the head of the Gulf shrimp fishermen's union that the legislative measure would not affect the Mexican Government and thus successfully persuaded the union to withdraw its opposition to his bill.

"Brazil considers shrimp a shelf resource, and, as is still fresh in our memories, this provoked a crisis between that country and France a few years ago. On May 6 this year, Congressman O'Neill (Massachusetts) introduced a bill (H.R. 11158) which purported to prohibit import of fishery products from any country which does not permit American fishing vessels to operate in waters not recognized as territorial seas by the United States. Apparently the principal aim of this bill was to check extension of territorial water limits by Latin American countries, and it may have had some bearing on Senator Barlett's persuasion in connection with U.S. shrimp fishing on the continental shelf off Mexico.

"In view of the circumstances described above, there are unmistakable indications that the U. S. Government plans to include king crab in the category of shelf resource under the new Act. However, this poses a problem involving the relationship between the U. S. Act and the historical king crab fisheries conducted by foreign countries.

"The purport of the U. S. Act is not to unconditionally exclude fishing by foreign nations. Article 1 of that Act provides that a foreign vessel will be authorized to engage in fishing by means of a specific international agreement or by means of a permit granted by the Secretary of the Treasury after the Secretary of the Interior has certified that it would be in the national interest and upon concurrence of the affected State (possession). In the latter case, fishing may be authorized only when the concerned foreign nation extends the same privileges to U. S. fishing vessels. Therefore, in recognizing the historical fisheries of other countries under this Act, some kind of specific agreement with the affected nation becomes necessary. In view of Japan's basic position, it is obviously impossible for Japanese fishing vessels to operate by means of permits granted by the U. S. Secretary of the Treasury, and Japan and the United States are expected to hold a meeting in the near future to develop an agreement whereby Japan could continue her king crab fishery in Bristol Bay.

"In addition to Japan, the Soviet Union is also conducting king crab fishing on a fairly large scale in Bristol Bay. Unlike Japan, the Soviet Union, which is a signatory to the Continental Shelf Convention, is faced with a delicate situation. The Soviet crab fishery in Bristol Bay has only a five-year history dating back to 1959, but will the United States recognize it as an historical fishery? If not, will the Soviet Union quietly withdraw from that fishery? Also, if the Soviet Union is excluded from the Bristol Bay crab fishery, will she recognize Japan's historical fishing operations off her coast (Sea of Okhotsk)? These matters are all of grave concern to Japan. (Aside from this problem, the Soviet Union recognizes Norway's historical fisheries in Russian terri-

Japan (Contd.):

torial waters under an agreement concluded between those two countries.)

"As stated above, despite the implementation of the Continental Shelf Convention and enactment of the Bartlett bill, Japan has been able to continue her king crab fishery in Bristol Bay. However, one big question looms in our minds. The continental shelf off Alaska, even if limited to a depth of 200 meters, embraces an area totaling about 600,000 square miles, approximating the size of the entire State of Alaska. The United States not only asserts jurisdiction over the subsoil resource in that vast sea area but attempts to bring under her jurisdictional control other high sea resources that have been historically available for utilization by all the countries of the world, such as the king crab, which at the harvestable season travel (whether they swim is still questionable) hundreds of miles on and beyond the continental shelf. This attitude of the United States, stemming from her own one-sided interpretation, cannot but create a feeling of fundamental skepticism.

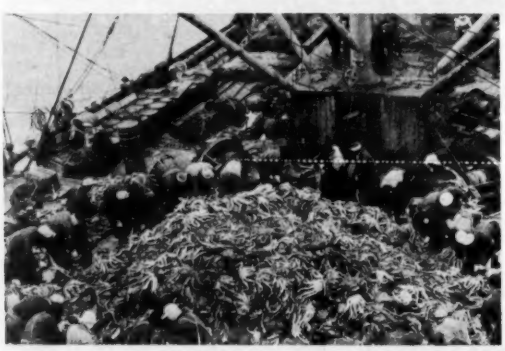
"After World War II, the unilateral acts imposed by many coastal countries have resulted in trampling upon the freedom of the high seas. The recent U. S. Act is a new challenge to this freedom and arouses concern not only because it tends to obscure the definition of living organisms belonging to the shelf resource but because it may result in lending support to those forces which seek to untilize it for their own advantage."

Note: See Commercial Fisheries Review, August 1964 p. 73; July 1964 p. 89.

* * * * *

KING CRAB OPERATIONS IN BRISTOL BAY:

The two Japanese king crab factoryships operating in Bristol Bay were packing an average of 500-600 cases a day. Production as of September 3, 1964, was 114,000 cases (target 120,000 cases) for the Tokei Maru (5,385 gross tons) fleet and 100,000 cases (target 115,000 cases) for the Dainichi Maru (5,859 gross tons) fleet. Both fleets were expected to attain their targets around September 15. (Suisan Tsushin, September 5, 1964.)



A large catch of crabs on the deck of a Japanese king crab factoryship.

* * * * *

BERING SEA MOTHERSHIP-TYPE BOTTOMFISH OPERATIONS:

Bottomfish catches by Japanese mothership fleets operating in the Bering Sea were exceeding those of 1963 as of August 1964. As of August 31, the combined fleet catch was about 340,000 metric tons, compared with about 240,000 metric tons for the same period in 1963. The herring catch of 42,000 tons this year was ahead of last year by about 10,000 tons. Fishing for that species had been terminated since production had already exceeded the target by 5,000 tons. Other Bering Sea catches as of August 31 were (1963 in parentheses): Alaskan pollack 161,000 tons (85,000 tons); rockfish 32,000 tons (9,000 tons); cod 18,000 tons (13,000 tons); flatfish 60,000 tons (50,000 tons); sablefish 5,500 tons (18,000 tons); halibut 2,000 tons (9,000 tons); shrimp 19,000 tons (25,000 tons).

The 1964 Bering Sea bottomfish operations were scheduled to be concluded in early October. (Suisan Tsushin, September 3, 1964.)

* * * * *

FREEZERSHIP RETURNS WITH ATLANTIC TRAWL-CAUGHT FISH:

The Japanese freezership Banshu Maru No. 12 (1,800 gross tons) returned to Shimonoseki, Japan, on September 5, 1964, with 1,250 metric tons of "kishima" sea bream taken off Southwest Africa. The freezership was assigned to the Japanese owners' trawling base at Cape Town, South Africa, in April this year. This was her second trip back to Japan with Atlantic trawl-caught fish. (Minato Shimbun, September 6, 1964.)

* * * * *

ATLANTIC TRAWL FISHERY:

The Atlantic trawl fishery holds the spotlight in Japan as the most promising enterprise among all Japanese distant-water fisheries. The fishery first developed in 1959 with two exploratory vessels to open up a new fishing ground for Japanese trawl operators seeking to transfer from the overcrowded East China Sea fishery. Subsequently it made a rapid expansion, and in 1963 the fleet had grown to 34 vessels with a total annual production of 92,082 metric tons of bottomfish.

The rapid expansion of the Japanese Atlantic trawl fishery is attributed to the abundance of high-value fish, such as sea bream, squid, and octopus, off the coast of West Africa, as well as to the growing market demand for those fish. Those

Japan (Contd.):

Expansion of Japanese Trawl Fishery, 1959-1963

Year	Size of fleet	Catch
	No. Vessels	Metric Tons
1963	34	92,082
1962	26	49,133
1961	15	27,952
1960	8	6,380
1959	2	802

circumstances led the Japanese Fisheries Agency in July 1963 to license the operation of an additional 13 vessels (6 over 1,000 gross tons, 1 under 1,000 but over 300 gross tons, and 6 under 300 gross tons) for the Atlantic trawl fishery. Those 13 newly licensed vessels are expected to be placed in operation within this year, along with 5 other new vessels earlier authorized by the Agency for construction. Therefore, by 1965, the Japanese Atlantic trawl fleet is expected to increase to over 50 vessels.

The principal areas of operation of the Japanese Atlantic trawl fleet are the waters off northwest Africa between 10-30° N. latitudes and the area off southwest Africa south of 30° S. latitude. In the northwest African fishing grounds, the principal species of fish taken are "sakura" sea bream, "monko" squid, and octopus. In the southwest African coast, "kishima" sea bream and "merluza" (hake) are primarily taken. Japanese vessels generally trawl at depths ranging from 60-200 meters (196.8-656 feet).

The trawl-caught fish are quick-frozen in the round or dressed. Sea bream, squid, and octopus, which command a high price in the Japanese market, are mostly transported back to Japan, while "merluza" and mackerel are practically all exported to European and African countries. Japanese exports of Atlantic-caught bottomfish to those countries are yearly increasing--sales in 1963 reached 38,000 metric tons.

Most of the Japanese trawlers operating in the Atlantic Ocean work out of either Las Palmas, Canary Islands, or Cape Town, South Africa. From those bases they go out on 30- to 40-day fishing trips and normally remain away from Japan for about 1-1/2-2 years. Crew members are rotated periodically, and some companies have instituted a program of flying replacements from Japan on chartered planes. (Nihon Suisan Shimbun, August 28, 1964.)

* * * * *

EXPLORATORY TRAWLING IN NORTHWEST ATLANTIC TO BE CONTINUED:

A large Japanese fishing company was granted a one-year extension of a fishing permit by the Japanese Fisheries Agency to continue experimental trawl operations in the Northwest Atlantic Ocean. The original one-year permit expired August 31, 1964. In the second year, the firm plans to change its method of operations and for that reason is considering replacing the trawler Tenyo Maru No. 3 (3,500 gross tons) now trawling in the Northwest Atlantic waters with a new 2,800-ton stern trawler presently under construction.

The Tenyo Maru No. 3, which is fishing together with two 300-ton trawlers in the Northwest Atlantic, was last reported as taking mostly rockfish, and her daily catch was said to be averaging 40-50 tons, falling below the production target of 60 tons per day. (Suisancho Nippo, September 1; Shin Suisan Shimbun, August 24, 1964.)

* * * * *

JAPAN TO JOIN NORTHWEST ATLANTIC FISHERIES CONVENTION:

The Japanese Fisheries Agency, in cooperation with the Foreign Ministry, is studying the the possibility of becoming a member of the various international fishery treaties which are considered likely to affect Japan's fishing industry. In particular, the Japanese Government is proceeding with definite plans to join the International Convention for the Northwest Atlantic Fisheries, which regulates fishing in the northwest Atlantic Ocean. Japan, which is conducting experimental trawl fishing in those waters, has been asked by the signatories to become a party to that Convention. (Suisan Keizai Shimbun, August 28, 1964.)

* * * * *

LONGER TRIP DOUBLES BOTTOMFISH CATCH FOR TRAWLERS IN NEW ZEALAND WATERS:

A large Japanese fishing company's trawlers (Taiyo Maru Nos. 56 & 57, each of 744 gross tons) landed a total of 3,000 metric tons of bottomfish in almost 9 months of trawling in New Zealand waters. This represents close to twice the catch that had been taken during comparable periods in previous years when that company's trawlers were shifted every 3 months. One-third of the catch consisted of sea bream and the rest was jack mackerel and Spanish mackerel. Most of the catches landed by the two trawlers were transshipped to Japan from Noumea, New Caledonia, by carrier vessels. In view of this success, the firm plans to extend the trip length for its future trawl operations in New Zealand waters. (Nihon Suisan Shimbun, August 10, 1964.)

* * * * *

LICENSING OF BOTTOMFISH OPERATIONS OFF NEW ZEALAND:

Japanese fishing vessel owners in Nagasaki, Japan, who are fishing bottomfish by longline in New Zealand waters, are planning on petitioning the Fisheries Agency to license that fishery in order to restrict the expanding Japanese vessel operations in that area. They fear that the present unrestricted fishing will

Japan (Contd.):

eventually deplete the local sea bream resources.

Long-line fishing in New Zealand waters attracted the attention of Japanese operators for the first time in 1963 when Chiyoda Maru No. 6 (472 gross tons) conducted experimental long-line fishing for bottomfish in that area in August 1963 and returned with 187 metric tons of sea bream in late November that year. Subsequently, Japanese long-liners began to converge on the new fishing ground until there were some 18 vessels working that area. (Minato Shimbun, August 14, 1964.)

* * * * *

STATUS OF VOLUNTARY FISHERY EXPORT CONTROLS, FY 1964:

Japanese "voluntary" fishery export controls in fiscal year 1964 (April 1964-March 1965) include quantitative and price controls. The United States is affected by the Japanese voluntary quantitative controls applied to shipments of frozen swordfish, frozen tuna, and frozen tuna loins and discs to the Western Hemisphere (see table). The United States is also affected by Japanese price controls on pearl shipments.

Japanese Voluntary Quantitative Export Quotas Affecting Shipments of Fishery Products to the United States, FY 1964

Product	Destination	Export Quota, Fiscal Year 1964 1/	Actual Exports to United States, Calendar Year 1963 2/	
		Quantity	Quantity	Value 3/
		(Metric Tons)		US$1,000
Swordfish, frozen	North and South American countries	5,500	6,363	4,218
Tuna, frozen	United States and Canada	4/ 111,800	52,021	17,598
Tuna loins and discs, frozen	United States and Canada	7,000		

1/April 1964-March 1965.
2/Exports to the United States on Japanese customs clearance basis during January-December 1963.
3/F.o.b. Japan.
4/Includes 110,000-ton quota for Japanese Frozen Food Exporters Association and 1,800-ton quota good for those who are not members of the Association.
Note: Export regulations have been listed as "voluntary" controls only when the export situation indicates they were imposed primarily for the purpose of maintaining orderly marketing abroad. The "voluntary" controls do not include those imposed as a result of (1) bilateral or multilateral agreements with other countries; (2) United States tariff quotas such as the quota on canned tuna in brine; and (3) Japanese regulations designed primarily to avoid or halt "excessive competition" among Japanese manufacturers and exporters.

Japan also applies voluntary fishery export controls which do not affect United States trade. Japanese exports of canned tuna in oil are subject to price controls, but that commodity is mostly not exported to the United States. Japanese shipments of canned sardines and mackerel to Burma are subject to a fiscal year 1964 quota of 200,000 cases (48 15-oz. cans), and Japanese shipments of frozen tuna to Europe are subject to a FY 1964 quota of 70,000 tons. (United States Embassy, Tokyo, August 11, 1964.)

Note: See Commercial Fisheries Review, May 1962 p. 63.

* * * * *

HOKKAIDO SAURY CANNERS SIGN ADVANCE PURCHASE AGREEMENT WITH FISHERMEN'S ASSOCIATION:

The 26 Hokkaido export saury canners on August 20, 1964, signed an advance saury purchase agreement with the Hokkaido Fishery Products Association, representing Hokkaido saury fishermen. This agreement, the first of its kind to be concluded in Japan, provides that: (1) the period of contract shall begin August 12 and end October 10 each year (although for 1964 the beginning date shall be September 3); (2) the total quantity to be contracted shall be 13,000 metric tons, with packers agreeing to purchase 160-200 tons daily at unloading ports; (3) canners shall pay a standard purchase price of 14.5 yen a kilogram (US$37 a short ton).

A similar agreement was under negotiation between 14 saury canners and 20 vessel owners in Choshi, Chiba Prefecture (south of Tokyo). Canners had offered to pay 18 yen a kilogram (US$45 a short ton), but producers were seeking an arrangement whereby price adjustments could be made in case the market advanced. (Minato Shimbun, August 22, 1964.)

* * * * *

FISH MEAL ASSOCIATION ORGANIZED:

The Japan Fish Meal Producers Association, a national organization of coastal fish meal producers, was formally organized at a meeting held on August 12, 1964. Business

Japan (Contd.):

activities to be conducted by the Association during the first year are: production survey, marketing research, and contact with the concerned agencies of the national Government. (Suisan Tsushin, August 13, 1964.)

* * * * *

FISHERIES AGENCY APPROVES JAPANESE-CHILEAN WHALE MEAT SALES AGREEMENT:

The Japanese Fisheries Agency on August 14, 1964, approved the whale meat sales plan arranged between a Japanese whaling firm and a Chilean firm. Under the sales agreement, the Japanese firm will sell its whale catches taken in the waters off Chile to the Chilean firm and will repurchase whale meat from it for export to Japan. The Japanese firm plans to repurchase 11,000 metric tons of whale meat from the Chilean firm at a price of about 20,000 yen (US$55) a metric ton, which it will freeze aboard the chartered Japanese freezership Seifu Maru (7,000 gross tons), for shipment back to Japan.

The Japanese firm plans to operate 5 catcher vessels for this whaling operation, for which it has established a catch target of 485 whalebone whales (converted to blue-whale units) and 640 sperm whales. This year is the Japanese firm's second year of whaling operations based in Chile. (Shin Suisan Shimbun, August 24, 1964.)

* * * * *

FISHING VESSEL CONSTRUCTION:

Data on Japanese fishing vessel construction compiled by the Fisheries Agency show that during the first quarter of fiscal year 1964 (April 1964-March 1965) the Agency approved the construction of 100 fishing vessels--68 steel vessels (totaling 27,257 gross tons) and 32 wooden vessels (totaling 1,091 gross tons). This was a sharp decrease from the same period in the past three years when 333 vessels were approved for construction in fiscal year 1963, 200 in fiscal year 1962, and 312 in fiscal year 1961.

While comparison with 1963 may not be appropriate, since that year saw a sharp increase in the construction of 39-ton class vessels prior to the Government's adoption of a new policy to license vessels in the 39-ton category, the fiscal year 1964 figure is a substantial decrease of over 50 percent even when compared with fiscal years 1961 and 1962. The Agency attributes that decline to poor business conditions prevailing in all the fisheries, and estimates that this slowdown in vessel construction will continue for the rest of the fiscal year.

A Japanese firm took delivery of its new stern trawler Ojika Maru (3,000 gross tons) built at a total cost of about 750 million yen (US$2.1 million). The Ojika Maru is equipped with filleting and fish-meal processing machines, and is one of the most modern fishing vessels in Japan. She was scheduled to depart Japan for the fishing grounds off West Africa on September 3, 1964. Specifications and complement of the Ojika Maru are: gross tonnage--3,000 tons; total length--310.8 feet; beam--48.9 feet; draft--23.5 feet; maximum speed--15.6 knots; freezing capacity--51.77 tons a day; cruising range--24,000 nautical miles; complement--80.

A new Japanese stern trawler Koyo Maru (2,521 gross tons) was delivered to her owners on September 1, 1964. After a five-day shakedown cruise in the East China Sea, the vessel was to depart Japan on September 10, 1964, for the trawl fishing grounds off West Africa, where she is scheduled to operate for a period of one year and three months.

Another Japanese fishery firm is building three 3,500-ton-class stern trawlers in Okayama Prefecture. The first trawler Aso Maru was scheduled for completion at the end of September and was assigned to the Bering Sea. The second vessel Kirishima Maru was scheduled to be launched in November and upon completion would be despatched to the Atlantic trawling grounds. The third vessel Takachiho Maru was tentatively scheduled to be assigned to the Gulf of Alaska upon completion. (Suisan Keizai Shimbun, September 9, 1964; Minato Shimbun, September 2 and 3, 1964; Shin Suisan Shimbun Sokuho, August 20, 1964.)

* * * * *

EIGHT FACTORYSHIPS TO BE BUILT FOR U.S.S.R.:

A large Japanese shipbuilding company has received orders from the Soviet State Fisheries Commission for the construction of eight 1,800-ton-class bottomfish factoryships. The firm's Yokohama shipyard was scheduled to commence construction of the vessels in Sep-

Japan (Contd.):

tember 1964 with plans to complete the first vessel in April 1965 and the rest by November 1966.

Construction of those vessels is expected to further intensify competition between the Soviet Union and Japan in the bottomfish fishery, but the view of the Japanese Fisheries Agency is that Japan will have to extend her cooperation to foreign fisheries if she is not to become isolated from other countries. (Suisan Keizai Shimbun, September 4, 1964.)

* * * * *

FISHERIES AGENCY TO BUILD LARGE RESEARCH VESSEL:

The Japanese Fisheries Agency's budget submission for fiscal year 1965 (April 1965-March 1966) contains a program to build a 2,600-gross-ton fishery research vessel. The vessel will be used to conduct investigative work on bottomfish resources in the northern waters (Okhotsk Sea, Bering Sea, and North Pacific Ocean), offshore waters of New Zealand and Africa, and in the northwest Atlantic Ocean.

At present, the Agency operates 11 research vessels, but the Shoyo Maru (641 gross tons), now being used for tuna investigations, is the only one that can be sent on distant-water cruises. All other distant-water resource and oceanographic investigations by the Agency are being conducted by chartering commercial research vessels or by placing Government researchers aboard commercial fishing vessels. (Suisan Keizai Shimbun, August 12, 1964.)

Republic of Korea

FREEZER VESSEL LAUNCHED AT NETHERLANDS SHIPYARD:

A new freezer vessel of 7,000 deadweight tons built by a Rotterdam, Netherlands, shipbuilding firm for a fishing firm in Pyongyang, North Korea, was scheduled for launching at its Alblasserdam shipyard in August 1964. The vessel has a storage capacity of 7,500 cubic meters (about 265,000 cubic feet) for frozen fish, that can be held up to -13° F. (United States Embassy, The Hague, August 29, 1964.)

Mexico

OPENING OF SHRIMP FISHING SEASON:

Mexico's West Coast commercial shrimp fishing season inside the coastal lagoons opened September 1, 1964, and some shipments have already been made.

The West Coast ocean shrimp fishing season was to have started on September 15 but the fishing cooperatives petitioned for a delay to October 1. In a compromise with the private vessel owners who reportedly wanted to open the season on schedule, the Mexican Government set the opening for September 22.

Meanwhile, on Mexico's East Coast on the Gulf, all parties concerned have reached agreement on conditions for the season and fishing was reported to be proceeding. (Fisheries Attache, U. S. Embassy, Mexico, September 19, 1964.)

* * * * *

NEW TARIFF RATES FOR FOUR CATEGORIES OF FISHERY PRODUCTS:

New tariffs on Mexico's imports of fishery products and byproducts were published in the Official Daily of September 1, 1964. The tariff on only four classifications was changed, including a lower duty on cod oil. The new tariff on cod oil imports is 0.25 pesos per gross kilogram (0.9 U. S. cents a pound) plus 10 percent. The old rate was 0.30 pesos per gross kilogram (1.1 cents a pound) plus 30 percent. The percentage figure is the additional rate based on invoice price or official price whichever is higher.

United States exports of cod oil to Mexico in 1963 were valued at $34,300, and in 1962 they were valued at $43,000.

Tariff changes on the other fishery classifications were (figures in parentheses are the old rates):

Live fish, except those for repopulation programs; each fish: 9.00 pesos (72 cents) plus 100 percent (1.00 peso or 8 cents plus 50 percent.)

Shellfish, fresh or frozen, not otherwise specified, per gross kilogram: 2.00 pesos (7.3 cents a pound) plus 60 percent (1.00 peso or 3.6 cents a pound plus 50 percent).

Shellfish, canned, not otherwise specified, per legal kilogram: 3.50 pesos (12.7 cents a

Mexico (Contd.):

pound) plus 100 percent (2.00 pesos or 7.3 cents a pound plus 100 percent). (Fisheries Attache, United States Embassy, Mexico, D. F., September 9, 1964.)

* * * * *

FOREIGN TRADE IN FISHERY PRODUCTS, 1963:

Exports: Shipments to the United States accounted for 99 percent of the value of total Mexican fishery exports during 1961-1963. The trade is dominated by fresh and frozen shrimp exports, which accounted for 88.6 percent of the value of total Mexican fishery exports in 1963. Mexican fishery exports, far in excess of fishery imports, are a major source of foreign exchange in Mexico and directly affect the income of thousands of Mexican fishermen.

The total value of Mexican fishery exports rose to a record $54.7 million in 1963. The increase was due mainly to higher average prices for the leading products, because the quantities shipped remained about the same as in 1962. Unit prices were also boosted in 1963 by the tendency to include a larger proportion of processed fishery products in the exports (such as peeled and deveined shrimp, and individually frozen shrimp).

A limited amount of canned and dried shrimp is also exported. Both were formerly of considerable importance, but have now dwindled away to practically nothing. Canada was the principal buyer of Mexican canned shrimp.

Second in importance among Mexican fishery export items is canned abalone, which accounted for 5 percent of the value of the fishery exports in 1963. In the last few years, exports of frozen sliced abalone meat have also achieved considerable importance. Formerly, dried abalone was exported in quantity, but the demand for frozen abalone in the United States has resulted in a diversion of abalone meat to that market.

Table 2 - Value of Mexican Exports and Imports of Fishery Products, 1961-1963

Item	1963	1962	1961
	.....(US$1,000).....		
Exports:			
Fresh or frozen	60,317.0	53,285.0	43,866.6
Canned	3,750.1	2,623.3	2,464.1
Salted, dried, etc.	39.6	37.0	40.9
Edible products, not specified	3.2	50.0	57.4
Industrial	598.6	518.7	482.6
Total fishery exports	64,708.5	56,514.0	46,911.6
Imports:			
Industrial	4,130.6	2,920.6	1,854.7
Salted, dried, etc.	562.0	491.3	365.4
Canned	158.3	279.2	385.0
Fresh or frozen	229.5	166.3	209.4
Total fishery imports	5,080.4	3,857.4	2,814.5

Note: Values converted at rate of ₱12.50 equal US$1.00.

All of the abalone for export is harvested in Baja California, mostly in the northern State.

Third in importance is spiny lobster with an annual value in 1963 of $878,700. Practically all of the export lobster is also produced in Baja California.

Mexico has developed a good market in the United States for frozen fish fillets with annual shipments valued at $0.5 million. Furthermore, much of the exports listed under "Other products" in table 1 are also fresh or frozen fish.

After the United States stopped buying frog legs from Cuba, exports of frog legs from Mexico increased considerably and there is interest in expanding Mexican frog production further.

Imports: Because the Mexican fishing industry can supply most of the needs of the Mexican market, fishery imports continue at a rather low level. Efforts of the Mexican Govern-

Table 1 - Mexican Exports of Principal Fishery Products, 1962-1963

Product	1963			1962		
	Qty.	Value		Qty.	Value	
	Metric Tons	US$ 1,000	% of Total Val.	Metric Tons	US$ 1,000	% of Total Val.
Shrimp, fresh & frozen	34,639.9	57,360.4	88.6	34,664.8	49,836.6	88.2
Abalone, canned	3,818.0	3,212.2	5.0	3,083.7	2,311.6	4.1
Spiny lobster, fresh & frozen	795.8	878.7	1.4	744.4	884.7	1.6
Fish fillets, fresh & frozen	1,441.9	520.8	0.8	1,383.3	538.7	1.0
Tuna, fresh & frozen	2,010.5	407.5	0.6	1,986.3	454.3	0.8
Abalone fillets, fresh & frozen	167.1	348.1	0.5	177.9	342.4	0.6
Marine algae	18,591.8	242.9	0.4	21,175.7	292.9	0.5
Frogs, fresh & frozen	314.0	236.0	0.4	293.9	232.1	0.4
Totoaba, fresh & frozen	366.8	86.8	0.1	745.7	452.1	0.8
Shrimp, canned	0.6	0.3	1/	240.7	298.0	0.5
Other products	3,952.6	1,414.8	2.2	3,076.7	870.6	1.5
Total fishery exports	66,099.0	64,708.5	100.0	67,573.1	56,514.0	100.0

Note: Values converted at rate ₱12.50 equal US$1.00.

Mexico (Contd.):

ment to further develop and diversify the Mexican fisheries may result in even smaller imports in the future.

By far the most important single fishery product imported by Mexico is Peruvian fish meal which is used as feed by the rapidly developing Mexican poultry industry. The only other fishery import of real importance is dried salted cod (mostly from Norway). Because of its low cost and its keeping qualities in extreme climates, salt cod or "bacalao" has long been a favorite throughout Latin America.

Marine oils and agar-agar are also imported products of some value. Most of the rest are luxury items which can not be produced in Mexico because the resources do not exist or the cost of production would be excessive. Those include such things as frozen eels, canned anchovy and anchovy paste, canned smoked oysters, frozen, canned and smoked salmon, canned crab, and caviar.

The United States is Mexico's third most important supplier of fishery products (after Peru and Norway). But United States fishery exports to Mexico were valued at only $320,700 in 1963. (United States Embassy, Mexico, D. F., August 27, 1964.)

* * * * *

FISHERIES TRENDS, 1963:

Shrimp: By far the dominant factor in the Mexican fishing industry is shrimp. Those landings in Mexico during 1963 were about the same as in the previous year, and down only 1.4 percent from the record landings in 1961. Shrimp landings in 1963 were reported from all coastal states and territories except Michoacan on the Pacific Coast and Quintana Roo on the Caribbean. Despite widespread operations on both coasts, some excess capacity is now reported in the Mexican shrimp industry.

The United States is the main market for Mexican shrimp. In the latter half of 1963, United States shrimp prices declined from the high levels established earlier in the year, and by early 1964 the profit margin in the Mexican shrimp industry had narrowed. Future market upsets could affect Mexican shrimp production adversely. For that reason, the industry is attempting to develop shrimp markets outside the United States, and real efforts are being made to diversify the entire fishing industry to avoid the difficulties of a monolithic fishery.

While Mexican shrimp landings at Gulf of Mexico ports have remained fairly steady for many years, catches on the Pacific Coast more than doubled between 1957 and 1961. Since 1961, the Pacific catch has shown a small decline (to 54,532 metric tons in 1963), while Gulf Coast landings increased (to 18,393 tons in 1963).

Table 1 - Mexican Shrimp Landings 1/ by State, 1957-1963

States by Coastal Grouping	1963	1962	1961	1960	1959	1958	1957
	(Metric Tons).						
West Coast:							
Sinaloa	28,092	29,293	30,863	25,306	18,613	15,007	12,102
Sonora	16,315	17,136	16,717	14,119	13,208	10,391	9,032
Oaxaca	5,972	5,512	5,799	7,440	8,455	5,931	3,350
Chiapas	2,092	1,887	1,648	1,949	1,568	1,401	1,592
Nayarit	918	652	1,031	584	1,217	1,803	1,133
Baja California, Norte	913	952	1,154	1,004	851	1,309	483
Colima	87	37	118	72	12	96	18
Baja California, Sur	72	35	126	32	193	119	47
Guerrero	56	127	116	63	24	139	122
Jalisco	15	3	3	46	92	1	30
Total West Coast	54,532	55,634	57,573	50,615	44,233	36,197	27,897
East Coast:							
Campeche	15,392	12,362	13,653	14,737	13,702	13,970	14,363
Veracruz	1,663	2,749	1,896	1,636	1,656	1,121	1,736
Tamaulipas	1,034	877	818	651	1,111	820	1,039
Tabasco	300	231	253	328	334	162	166
Yucatan	4	-	-	-	-	-	-
Total East Coast	18,393	16,219	16,420	17,372	16,803	16,073	17,304
Total Mexican shrimp landings	2/72,924	2/71,852	2/73,995	67,987	61,036	52,270	45,201
Total landings divided on percentage basis:							
	(Percent)						
West Coast	74.8	77.4	77.8	74.4	72.5	69.3	61.7
East Coast	25.2	22.6	22.3	25.6	27.5	30.7	38.3

1/Heads-on weight.
2/Total does not exactly equal combined East and West Coast landings.

Sinaloa is now the leading Mexican shrimp State, accounting for almost 39 percent of the total catch in 1963. Sonora, also on the Pacific Coast, was in second place in 1963 with about 22 percent of the total.

Campeche on the Gulf of Mexico was for many years the leading Mexican shrimp-producing State until the upsurge of the Pacific Coast fishery. Campeche landings fluctuated from about 12,000 to 15,000 tons between 1957 and 1962 with a low in 1962. The catch improved to a high of 15,392 tons in 1963, or 21 percent of the national total. (The waters off Campeche produce far more than the Mexican landings indicate. United States shrimp vessels fish in the Gulf of Mexico outside Mexican territorial waters and land directly at Florida and Texas ports.)

Fourth in importance is Oaxaca on the Pacific Coast. Catches increased rapidly in 1958 when many vessels transferred to Salina Cruz from the Gulf of Mexico. Landings peaked at 8,500 tons in 1959 and have leveled off at about 6,000 since then. In 1963 Oaxaca accounted for 8 percent of the total Mexican shrimp catch.

Landings in other Mexican states accounted for the remaining 10 percent of Mexican shrimp landings. Veracruz, which supplies much of the fresh shrimp for the domestic Mexican

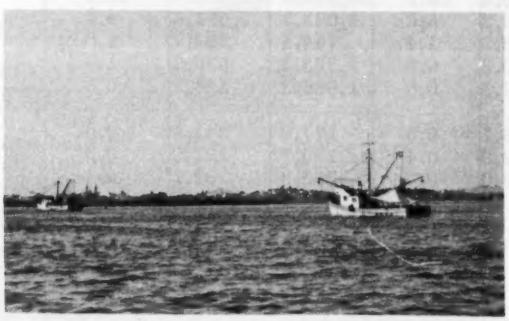


Fig. 1 - Mazatlan, Sinaloa, as seen by a shrimp fishing vessel returning to port.

Fig. 2 - Part of the 270 shrimp fishing vessels operating out of the port of Mazatlan.

Mexico (Contd.):

Fig. 3 Part of canoe fleet of about 100 that lands on beach at Mazatlan.

market, has had widely fluctuating catches ranging between 1,100 and 2,700 tons since 1957.

Shrimp landings were reported in 50 Mexican ports in 1963, but 5 ports accounted for over 72 percent of the total catch.

Mazatlan, Sinaloa, bases its claim to be the shrimp capital of the world on its 1963 landings of 19,328 tons which accounted for 26.5 percent of the Mexican shrimp catch. In order, the other leading ports in 1963 were: Guaymas, Sonora, 12,430 tons (17.0 percent); Ciudad Carmen, Campeche, 10,289 tons (14.1 percent); Salina Cruz, Oaxaca, 5,629 tons (7.7 percent); and Campeche, Campeche, 5,086 tons (7.0 percent). Puerto Penasco, Sonora, reported 2,734 tons, and 5 other ports took delivery of a little over 1,000 tons each.

Table 2 - Mexican Fishery Landings 1/ of Edible Species, 1961-1963

Species	1963	1962	1961
	(Metric Tons)		
Shrimp	72,924	71,852	73,995
Oysters	19,770	18,320	19,186
Sardine	19,394	14,918	20,375
Abalone	8,281	7,231	6,443
Mackerel (Pacific & jack)	7,887	3,202	4,922
Jewfish, grouper, cabrilla	7,238	6,083	5,833
Shark	4,776	4,637	4,859
Tuna	4,038	3,812	3,207
Spanish mackerel (sierra)	3,867	4,025	3,898
Snapper	3,491	2,883	2,198
Mullet	3,472	3,189	3,144
Snook (robalo)	3,299	3,976	3,071
Clams (marine & fresh-water)	2,071	2,237	2,248
Mojarra (marine & fresh-water)	1,849	1,568	1,584
Corvina	1,637	1,560	1,242
Anchovy	1,637	1,066	244
Whitefish, fresh-water	1,505	1,275	980
Tarpon, milkfish	1,451	1,762	1,686
Spiny lobster	1,281	1,230	1,190
Totoaba	1,108	1,245	798
Yellowtail, jacks, pompano	1,095	1,291	1,210
Croakers	1,060	766	984
Marine turtles	948	1,451	1,330
Miscellaneous species	26,542	15,777	12,794
Tot. landings of edible species	200,621	175,356	177,421

1/Landings are shown on a live-weight basis. For certain species, live-weight landings were computed.

Fig. 4 - General view of fishing boats in harbor at Ensenada, Baja California.

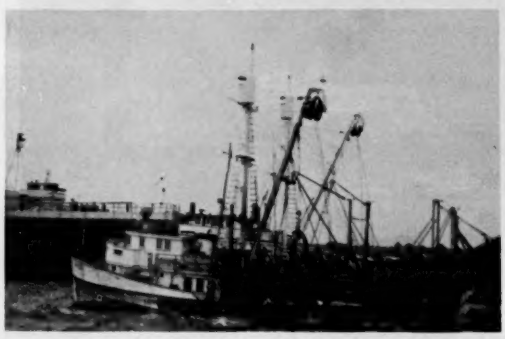


Fig. 5 - Purse seiners unloading sardines and mackerel at Ensenada. Suction pumps are on floating barge between vessels. Belt conveyors carry fish to trucks.

Other Major Fisheries: Although the Mexican shrimp industry has apparently reached a plateau, other Mexican fisheries have considerable potential for expansion. In 1963, Mexican landings of edible fish other than shrimp were up 23.4 percent from the comparable landings in 1962. The increase was due mainly to a gain in landings of species in the "miscellaneous" classification (table 2).

In the Mexican fisheries, during the period 1961-1963, oysters (shell weight) and sardines alternated in second and third place (from a volume standpoint). Oysters, which are taken mainly for the Mexican domestic fresh market, showed relatively steady production during the 3 years at about 19,000 tons. The greater part of the oyster harvest comes from the Tampico area.

The sardine catch has fluctuated widely, depending on the availability of fish to the Ensenada fleet. The sardine vessels, equipped with brine refrigeration, fish several hundred miles south of their home port in order to maintain production when the fish fail to appear in local waters. Sardines are canned, mainly for domestic consumption, although some are exported. The same fleet, based at Ensenada, also takes Pacific mackerel and jack mackerel for canning. The reported mackerel catch increased sharply in 1963 to nearly 8,000 tons. Actually, sardines and both species of mackerel are often landed in mixed loads. Therefore, it may be more accurate to say that the combined sardine-mackerel fishery for the canneries yielded a catch of 27,281 tons in 1963 as compared with 18,120 tons in 1962 and 25,297 tons in 1961.

Industrial Fish: Landings of industrial fish and the output of industrial fishery products in Mexico is not of great significance.

Mexico (Contd.):

Fig. 6 - Largest fish cannery (sardines, mackerel, tuna) in Mexico at El Sauzal, Baja California Reduction and stickwater plants at left.

Fig. 7 - Butchering four large sharks on the beach at Teacapan, Sinaloa.

Omitting kelp (19,054 tons were harvested in 1963), Mexican output of industrial products averaged 7,774 tons annually in 1961-63. The most important item on a weight basis was fish meal. However, the annual fish meal production, which averages about 5,500 tons, is far from sufficient for the needs of the Mexican poultry industry, and fish meal has become Mexico's major fishery import. (United States Embassy, Mexico, D. F., August 27, 1964.)

* * * * *

JOINT JAPANESE-MEXICAN WHALING VENTURE IN MEXICO PROPOSED:

Negotiations were under way between a Japanese whaling firm and Mexican interests for the establishment of a joint Japanese-Mexican whaling venture in Ensenada, Baja California. The Japanese firm was expected to send a representative to Mexico to discuss the details of the arrangement and was also scheduled to conduct an exploratory survey off the Baja California peninsula in early September 1964 with two catcher boats (Kyo Maru Nos. 20 and 22). The catchers will conduct the survey for about one week after which they will proceed to the whaling base at South Georgia Island. If agreement can be reached between the two national interests, the Japanese firm plans to send a freezership and several catcher boats to Ensenada in the spring of 1965. (Suisan Keizai Shimbun, August 27, 1964.)

* * * * *

FOUR FISHERY TRAINING VESSELS ORDERED BY GOVERNMENT:

Four all-purpose 32-foot fishing vessels with fiberglass hulls were ordered in the summer of 1964 by the Mexican Government. The vessels will be used for training purposes by the Practical Fishing Schools at La Paz (Baja California Sur) and Manzanillo (Colima). Each of the vessels has accommodations for four men. One of the vessels may be loaned to a fishermen's cooperative.

The vessels have been ordered through a Mexican shipyard in Mazatlan. Fiberglass hulls for the vessels are being built under a subcontract by a United States firm in Kirkland, Wash. The first vessel will be completely outfitted and delivered ready to fish by the United States builder. The fiberglass hulls of the other three will be finished and outfitted at the Mazatlan yard.

Each of the new vessels will be capable of fishing gill nets, small purse seines, long lines and other gear, and will be able to carry up to five tons of iced fish. They will be equipped with all-purpose winches, hydraulic net drums, and power blocks. The vessels will be powered by 130-horsepower engines. (United States Embassy, Mexico, D. F., September 10, 1964.)

Morocco

JOINT MOROCCAN-FRENCH TUNA FISHING EXPLORATION PLANNED:

The Government of Morocco has been contemplating a one-year tuna fishing exploration program using an adequately equipped tuna fishing vessel of about 250 tons. The main objective is to determine in a more scientific manner the tuna resources available off the Moroccan coast before investing in expanded tuna canning facilities.

It was reported that Moroccan Government authorities were considering an offer by a French group to carry out the experimental project, and that a partial subsidy might be forthcoming from the French Government. Later developments brought about an agreement between the Moroccan Government and the French group for implementation of the program. The French vessel in question, which had been fishing in the waters south of Morocco, was said to be equipped to fish using both purse-seine and live-bait methods. The vessel was supposed to be available and ready to begin the experiment about September 1 this year, and a joint organization to handle the project has been set up.

Morrocco (Contd.):

A spokesman stated that the project was to be carried out as closely as possible in line with recommendations made by a United States tuna expert who conducted a tuna fishing survey in Morocco in July 1963. Tuna catches will most likely be sold in the ports of Safi and Agadir to local canneries. No price has been fixed for the tuna as yet, but it is believed that this might be in the negotiation stage with the French. It is presumed that some Moroccan crewmen will be taken aboard the French vessel.

The spokesman for the project stated he hoped the experiment would be carried out in the most effective way possible, and that the results would be made available to United States as well as European tuna canning groups and financial institutions. He expressed the hope that if the results of the survey are positive and confirm that there is a basis for a modern and expanded tuna canning industry in Morocco, that United States firms might be interested in taking part in the development of the plants and fishing program. (United States Embassy, Rabat, August 28, 1964.)

* * * * *

CANNED SARDINE LOANS RECEIVE RENEWED PARTIAL GUARANTEE FROM GOVERNMENT:

The partial government guarantee for bank loans on canned sardines in Morocco was renewed for the period April 1964-March 1965 by Moroccan Decree No. 311-64 of May 11, 1964, issued by the Minister of Economic Affairs, Finance, and Agriculture (published in the Bulletin Officiel No. 2697, July 8, 1964).

The guarantee was originally established by Dahir 1-56-329 of January 8, 1956. Under the conditions and ceilings specified by an annual implementing decree, that dahir authorizes the government to guarantee against depreciation of security or bankruptcy of debtor up to 20 percent of the total amount of credit advanced annually to dealers in canned sardines.

Under the implementing decree for 1964/65, bank loans for canned sardines are fixed at an annual interest rate of 4.5 percent and must not exceed 32 dirhams (US$6.40) per case for ordinary sardines and 50 dirhams ($10.00) per case for skinless and boneless sardines. Only one million cases of sardines may be covered by guaranteed loans at any one time. Within their quotas, however, exporters may continually substitute new cases for exported cases covered under guaranteed loans. (United States Embassy, Rabat, August 18, 1964.)

Norway

EXPORTS OF CANNED FISH, JANUARY-JULY 1964:

Norway's total exports of canned fish during January 1 - July 4, 1964, were up 5.0 percent from those in the same period of 1963, due mainly to larger shipments of canned brisling and canned soft herring roe.

Norwegian Exports of Canned Fish

Product	1/ 1/1-7/4 1964	1/1-7/6 1963
	. . (Metric Tons). .	
Brisling	3,035	2,607
Small sild	6,615	6,720
Kippered herring	1,555	1,627
Soft herring roe	968	497
Sild delicatessen	224	211
Shellfish	876	807
Other fishery products	1,593	1,694
Total	14,866	14,163

1/Preliminary.

The packing of sild sardines started in early May and by July 25, 1964, a total of 139,425 standard cases of small sild had been packed, compared with 154,184 standard cases in the comparable period of 1963.

The pack of brisling from the start of the season in late May to July 25, 1964, amounted to 278,485 standard cases, compared with 201,090 standard cases in the same period of 1963.

Mackerel landings for canning purposes totaled 147 tons as of July 11, 1964, compared with 487 tons in the corresponding period of 1963. (Norwegian Canners Export Journal, August 1964.)

* * * * *

HERRING FISH MEAL QUALITY CONTROL STUDIES:

The use of nitrite to preserve herring and other fish intended for industrial purposes was one of the main subjects discussed in a report on 1963/64 research activities of the Norwegian Research Institute of the Herring Oil and Meal Industry. The report was pre-

Norway (Contd.):

sented at the annual meeting of the Board of Representatives of the Fat Herring Fishermen's Marketing Cooperative which was held in Trondheim, Norway, August 27-28, 1964. Following are highlights of the report as published in Fiskaren, August 26, 1964:

Preservatives for Industrial Fish: A high-priority project is the development of preservatives for fish being transported to the reduction industry. The extension of the industrial fishery into distant waters has made this project particularly urgent.

Research is continuing on the possible production of toxins in industrial fish preserved with nitrite. The research is designed to determine what nitrite concentrations and conditions might cause toxic material to be produced. Investigators are also trying to determine whether nitrite together with any toxins present can be removed from industrial fish by adding acid or applying steaming treatments.

In the industrial fishery off Iceland, experiments are being conducted with lower than usual concentrations of nitrite in the preservation liquid. Also, steps have been taken to find better application equipment for vessels as well as for factories. In the meantime, there is every reason for the reduction industry to show the greatest care when using nitrite preservative. For that reason, the Norwegian Herring Meal Inspection Office has tightened its instructions and effected special measures for the use of nitrite.

Handling Fish Meal in Bulk: Storing and shipping herring meal in bulk can simplify transport requirements. Investigations have shown there is no problem with bulk shipments when airtight containers are used. An initial shipment of 100 metric tons of fish meal in bulk was sent to Sweden in the summer of 1964. The shipment proceeded normally and was discharged without difficulty.

Fish Meal Uniformity: In order to encourage the production of high-grade products, a premium is paid annually for herring meal which satisfies certain standards. Buyers are becoming increasingly quality-minded and have become particularly strict in their demand for uniformity. The Norwegian reduction industry with its varied raw material and decentralized industry has unusual problems in achieving uniformity. The installation of mixing equipment to achieve gradually the goal of uniformity seems to be necessary. In cooperation with the Norwegian Herring Fishermen's Producer Cooperative, the Research Institute has promoted the development of suitable silos and has helped 16 fish meal manufacturers design mixing equipment. (United States Embassy, Oslo, September 20, 1964.)

Panama

TUNA FISHING REGULATIONS FOR FOREIGN VESSELS IN PANAMANIAN WATERS:

To regulate foreign tuna fishing within its claimed territorial waters (12 miles), the Republic of Panama issued Decree No. 127 of July 28, 1964. Under the new decree licenses must be obtained, fees must be paid, and other requirements must be met by foreign fishermen who wish to operate tuna vessels within Panamanian waters.

The owner of such a foreign tuna vessel must obtain from Panamanian authorities (1) a permit issued by the Ministry of Agriculture, Commerce, and Industries; (2) a fishing license issued by the Department of Fisheries and Related Industries (good only during season of September 1 and August 30 of following year); and (3) a special navigation license issued by the Ministry of Finance and Treasury. A Panamanian tax of $5 per registered net vessel ton or fraction thereof on foreign tuna vessels operating in Panamanian waters has also been established.

The new decree sets up a number of other requirements which must be met by foreign tuna vessels off Panama. Some of those are: (1) every vessel which receives a Panamanian license for tuna fishing must purchase supplies, lubricants, fuel, and repair services in Panama rather than in the Canal Zone; (2) vessels which obtain Panamanian tuna licenses must employ at least two Panamanian sailors during the period when they are fishing in Panamanian waters; (3) at the end of each fishing season, fishing vessel owners must present a detailed report on the tuna catch (species caught and total catch) to the Panamanian Department of Fisheries and Related Industries.

The tuna fishing authorization does not include permission to catch other fishery species (such as sardine, herring, and shrimp). Foreign tuna fishing vessels are forbidden to use fishing equipment and techniques which might be harmful to local marine life in Panamanian waters. Foreign tuna fishing vessels are forbidden to sell fishery products within the territorial waters of Panama or its local markets without previous authorization by the Panamanian Ministry of Agriculture, Commerce, and Industries.

Penalties provided by the new Panamanian decree for violations are: (1) minimum fine of $1,000, maximum fine of $10,000, according to the seriousness of the offense; and (2) confiscation of the catch of the vessel involved. (United States Embassy, Panama, September 3, 1964.)

Peru

FISH MEAL AND OIL INDUSTRY TRENDS, JANUARY-JULY 1964 AND OUTLOOK IN SEPTEMBER 1964:

Outlook: Production and exports of fish meal were at a record level in Peru during January-July 1964, although Peruvian fish meal output in June and July 1964 was down from the extremely high levels reached in the early months of 1964 (table 1). Peru usually experiences a seasonal decline in fish meal production in the third quarter, with output expanding again in the latter part of the year. This year, however, there are uncertainties in the outlook for the anchoveta fishery, which is the mainstay of the Peruvian fish reduction industry. In an exploratory survey in early September 1964, the Peruvian Institute of Marine Resources swept three-fourths of the Peruvian coastal fishing area with some 35 vessels furnished by the reduction industry. Echo-sounding equipment did not reveal major concentrations of fish. That was disappointing because large schools of anchoveta have appeared off Peru in September during past years. Water temperature data were collected during the survey of the fishing areas. Analysis of those data may throw more light on anchoveta fishing prospects during the remainder of the year.

Fish Meal Supply Situation: On May 15, 1964, Peruvian stocks of fish meal totaled 271,544 metric tons (table 2).

Table 1 - Peruvian Fish Meal Production and Exports, January-July 1963-1964

Month	Production		Exports	
	1964	1963	1964	1963
	(1,000 Metric Tons)			
January	196	146	102	147
February	125	46	101	104
March	175	122	186	104
April	159	129	142	96
May	123	160	133	78
June	92	99	106	85
July	84	39	142	110
Total Jan.-July	954	741	912	724

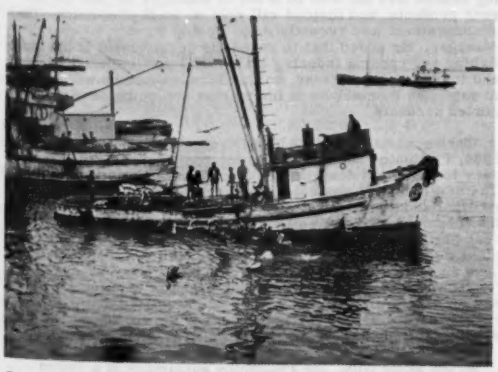


Fig. 1 - In Peru, anchoveta boat waiting to unload at the Port of Chimbote.

Table 2 - Peruvian Fish Meal Supply Situation, Jan. 1-May 15, 1964 with Comparisons

Item	1964	1963	1962	1961
	(Metric Tons)			
Supply:				
Carryover stocks, January 1	156,372	192,884	156,774	76,985
Production, Jan. 1-May 15	710,201	512,599	388,113	314,061
Total available supply, Jan. 1-May 15	866,573	705,483	544,887	391,046
Disposition, Jan. 1-May 15:				
Exports	584,801	488,632	401,774	279,014
Other disposition 1/	10,228	10,388	5,375	8,685
Carryover stocks, May 15	271,544	206,463	137,738	103,347

1/Includes domestic sales in Peru (6,156 tons in January 1-May 15, 1964) and "other" unexplained disposition.

Those stocks were substantially reduced by heavy export shipments in mid-1964. During the period May 15-July 30, 1964, Peruvian fish meal exports amounted to 327,000 metric tons while Peruvian fish meal production amounted to only 243,000 metric tons. (Editor's Note: Peruvian fish meal

Table 3 - Peruvian Fish Meal Exports by Country of Destination, January 1-May 15, 1964

Country of Destination	Quantity
	Metric Tons
United States:	
East Coast	128,112
West Coast	23,084
Hawaii	495
Total United States	151,691
Germany, West	92,063
Germany, East	15,898
Austria	500
Brazil	1,589
Belgium	16,221
Colombia	1,650
Czechoslovakia	10,700
Spain	19,218
Philippines	3,099
France	19,867
Netherlands	74,339
Hungary	14,199
Great Britain	23,139
Rumania	3,000
Italy	24,121
Japan	59,057
Mexico	16,673
Poland	4,950
Sweden	6,175
Venezuela	7,574
Yugoslavia	18,397
Other countries 1/	681
Total all countries	584,801

1/Includes shipments to Argentina, Bolivia, Ecuador, El Salvador, and and Taiwan.

Peru (Contd.):

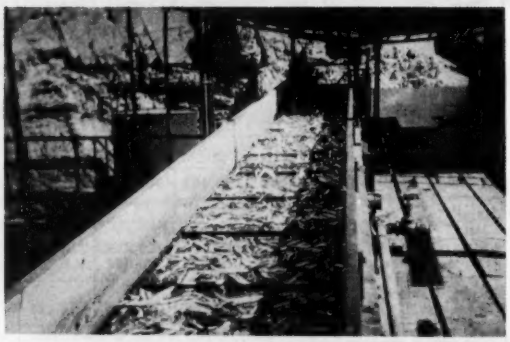


Fig. 2 - Conveyor belt carrying anchovies into fish meal plant for processing.

prices--for 65 percent protein meal f.o.b. United States East Coast and Gulf ports--increased from US$123-125 per short ton in late May 1964 to $133-137 per short ton in late September 1964.)

Fish Meal Exports by Country of Destination, January 1-May 15, 1964: The United States was the leading buyer of Peruvian fish meal during January 1-May 15, 1964, with 26 percent of total shipments, followed by West Germany with 16 percent, the Netherlands with 13 percent, and Japan with 10 percent (table 3).

Table 4 - Peruvian Marine Oil Exports by Country of Destination, January 1-May 15, 1964

Product and Country of Destination	Quantity
	Metric Tons
Crude Fish Oil:	
Germany	1,450
Netherlands	3,741
Total crude fish oil exports	5,191
Semirefined Fish Oil:	
Germany	7,415
Netherlands	10,959
Colombia	2,190
Czechoslovakia	1,750
Denmark	5,905
France	1,10[illegible]
Norway	2,31[illegible]
United Kingdom	28[illegible]
Sweden	280
Total semirefined fish oil exports	32,191
Sperm Oil:	
Netherlands	400
Total marine oil exports	37,782

Fig. 3 - The fish are being pumped from the boat to awaitnig truck.

The Consorcio Pesquero del Peru S. A. (Fisheries Consortium of Peru) is the leading marketing agency for Peruvian fish meal exports. During January 1-May 15, 1964, the Consortium shipped 402,213 metric tons of fish meal or about 69 percent of total fish meal exports. The remainder was shipped by producers who do not belong to the Consortium.

Marine Oil Exports by Country of Destination, January 1-May 15, 1964: The leading buyers of Peruvian crude and semirefined fish oil during January 1-May 15, 1964, were the Netherlands and Germany (table 4). Sizable shipments of semirefined fish oil were also made to Denmark, Norway, Colombia, Czechoslovakia, and France. (United States Embassy, Lima, September 10, 1964.)

Philippines

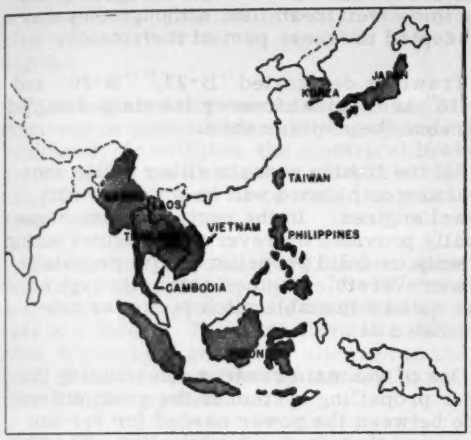
DEVELOPMENT OF FISHING INDUSTRY SPURRED BY CHANGE IN GOVERNMENT IMPORT POLICY:

The National Marketing Corporation (NAMARCO), a Philippine Government agency, will phase out its policy of importing canned fish tax free in order to stabilize the market for such products, and instead will rely on local production. The announcement was recently made by that Agency's General Manager. He added that to speed the development of the local fishing and canning industry NAMARCO will import tinplate and tomato paste tax free, so that local canneries will be able to establish themselves in the market and compete with imported products.

Taking advantage of NAMARCO's new policy, on August 17, 1964, Philippine and Australian interests formed a new company to engage in deep-sea fishing, fish storage, and canning. The new company was capitalized at 15 million pesos (US$4.3 million) and authorized to import its tinplate requirements tax free until 1967. An official of the firm, which is 60 percent Philippine and 40 percent Australian, estimated that the plant would begin operations by the middle of 1965. It will have an estimated annual output of 800,000 cases of sardines for local consumption, and 600,000 cases of tuna for export and for the Philippine market. It is anticipated that the major export market will be Australia, where Philippine canned fish will replace imports from Japan.

At the same time, the Philippine subsidiary of a United States firm is planning to extend its operations in the Philip-

Philippines (Contd.):



pines. The Philippine subsidiary, which is 51 percent American, reportedly has acquired a site for its operations, purchased the necessary equipment, commissioned the building of fishing vessels in Japan, and will go into operation in February 1965. Like the newly formed Philippine-Australian firm, the subsidiary of the United States company intends to export a part of its production of canned tuna and sardines to other markets but will sell most of it in the Philippines.

It was stated that NAMARCO's new policy would also result in increased output of a third Philippine cannery which is operating in the southern Philippines. Philippine Government officials, as well as the local business community, are confident that the policy change will boost Philippine production of canned fish from its present level of 60,000 cases a year to the point where it will eventually meet the national requirement of 2.4 million cases. (United States Embassy, Manila, August 25, 1964.)

Poland

FISHING VESSEL CONSTRUCTION PROGRAM:

The Government of Poland is planning to construct, during the next 5 years (1966-1970), 130 fishing vessels with a total deadweight tonnage of 346,000--averaging over 2,600 tons each. Like the vessels constructed in Poland during the previous 5-year plan (1961-1965), most of the new fishing vessels will go to the Soviet Union. During 1966-1970, Polish shipyards at Gdansk are scheduled to construct a total of 83 fishing vessels (24 large motherships and 59 stern factory trawlers). Other fishing vessels will be built at Gdynia and Szczecin. (Tygodink Morski, May 17, 1964, and Trybuna Ludu, August 8, 1964.)

The growing importance of Polish shipyards is related to the CEMA (Communist Common Market) Agreement under which Poland has been assigned the task of building ocean-going vessels for the entire Soviet Bloc. The average production costs during the 1966-1970 vessel construction plan are expected to be 10 percent below those of the 1961-1965 plan due to savings made possible by specialization and mass production. Also, fewer classes of vessels will be built.

Following is a report on the Polish fishing vessel construction industry which appeared in the Polish Maritime News, August 1964:

Construction of Large Fishing Vessels, 1963 and January-June 1964: Poland has important fishing vessel construction facilities at the ports of Gdansk, Gdynia, and Szczecin. In 1963, Poland was second only to Japan in total tonnage of fishing vessels constructed (table 1). The 15 large fishing vessels (of more than 100 gross tons) launched by Polish shipyards in 1963 included 7 refrigerated stern trawlers of 850 gross tons each, 6 factory stern trawlers of 2,670 gross tons each, and 2 factory motherships of 9,250 gross tons each.

Table 1 - World Launchings of Fishing Vessels (of More Than 100 Gross Tons), 1963 with Data for Leading Countries

Item	No. of Vessels	Gross Tonnage	Percentage of Total
Total world fishing vessel launchings 1/	541	205,847	100.0
Launchings 1/ by Leading Countries:			
Japan	230	80,183	38.9
Poland	15	40,470	19.7
Spain	93	23,128	11.2
German Federal Republic	12	10,453	5.1
Netherlands	49	9,932	4.8
France	45	9,816	4.8
Norway	39	9,416	4.6
Canada	23	5,193	2.5
Denmark	1	4,700	2.3
Great Britain	12	4,378	2.1

1/Excludes vessels of less than 100 gross tons.

Gdansk specializes in the construction of factory motherships and factory stern trawlers. Gdynia concentrates on building large fishing trawlers (other than factory trawlers.)

In the first half of 1964, Gdynia shipyards completed 3 trawlers ("B-23" type) of 850 gross tons each, and Gdansk shipyards com-

Poland (Contd.):

pleted 1 factory mothership ("B-64" type) of 9,250 gross tons and 2 factory trawlers of 2,670 gross tons each.

During the first half of 1964, Polish shipyards had under construction 7 large trawlers with a combined gross tonnage of 4,455 tons, 12 factory trawlers with a combined gross tonnage of 31,760 tons, and 5 factory mothership with a combined gross tonnage of 46,250 tons. Poland is building trawlers for France and Great Britain as well as for the Soviet Bloc.

Large Fishing Trawlers: Up to 1962, Gdynia shipyards built several types of side trawlers. In 1963, the first trawlers designed for fishing from the stern were delivered by Gdynia. Although a few side trawlers (type "B-20/II," "B-27/I," and "B-27/II") are still being built, the main emphasis has shifted to stern trawlers. The main specifications of fishing vessels under construction or planned at Gdynia are shown in table 2.

Certain planned trawler types ("PK-1322," "PK-1319," and "B-28") are designed primarily to deliver fresh fish, although they may be adapted to freeze part of their catch.

Trawlers designated "B-23," "B-29," and "B-18" are typical freezer trawlers designed to freeze their entire catch.

All the fishing vessels either under construction or planned will be provided with Diesel engines. In the past, propulsion was usually provided by reversible engines acting directly on solid propellers. But propulsion by nonreversible engines acting through a gear on an adjustable pitch propeller predominates at present.

One of the main reasons for adopting the latter propelling system is the great difference between the power needed for service speed and that needed for trawling. The main engine has surplus power at trawling speed. In order to use that surplus power, two generators are usually attached to the engine gear, one of which drives the trawl winch. There

Table 2 - Polish Trawler[1] Specifications by Main Vessel Types

Designation	Description of Vessel	Length Overall	Length Between Perpendiculars	Deadweight Tonnage	Hold Capacity	Propulsion[2]	Trial Speed
		Meters	Meters	Metric Tons	Cubic Meters		Knots
B-20	Freezer stern trawler	61.55	55.10	500	519	Diesel--1,375 hp. at 275 r.p.m.	13.1
B-20/I	Starboard trawler	63.22	56.38	495	509	Diesel--with gear of "father and son" system--1,310 hp. at 400 r.p.m.	14.33
B-20/II	Starboard trawler	63.20	56.50	500	580	Diesel-1,800 hp. at 250 r.p.m.	15.00
B-27/I	Starboard trawler	47.43	42.50	215	295	Diesel--with gear--1,200 hp. at 380 r.p.m.	13.50
B-27/II	Starboard trawler	47.43	42.50	215	330	4 Diesel engines--with gear--1,200 h.p. at 1,250 r.p.m.	13.50
PK-1322	Stern trawler[3]	43.72	38.00	200	300	Diesel--with gear--1,200 hp.	13.5
PK-1319	Stern trawler[3]	50.10	44.00	300	400	Diesel--with gear--1,500 hp.	14.0
B-28	Stern trawler[3]	56.50	50.00	400	500	Diesel--1,800 hp.	14.5
B-23	Freezer stern trawler	69.35	60.00	600	570	Diesel--with gear--1,600 hp. at 400 r.p.m.	14.0
B-29	Freezer stern trawler	75.50	68.00	800	1,150	Diesel--with gear--2,400 hp. at 500 r.p.m.	14.0
B-18	Freezer stern trawler	85.20	80.00	1,250	1,700	Diesel--2,250 hp. at 225 r.p.m.	13.80

1/Does not include factory trawlers.
2/All vessel types listed have an adjustable propeller except the "B-20," the "B-20/II," and the "B-27/I," which have a solid propeller.
3/Planned for future construction.
Note: To convert meters to feet multiply by 3.28 feet. To convert cubic meters to cubic feet multiply by 35.3147 cubic feet.

Poland (Contd.):

are also 1 or 2 generating sets in the power plant which are driven by separate Diesel engines.

That engine design assures good use of main-engine power under varying operating conditions. In addition, the electrical brake system of the trawl winch is simplified by using the engine gear to operate the trawl generator.

Emergency propulsion is fitted on some vessels. For example, on the "B-23" trawlers, the main engine can be disconnected in case of a defect. The propeller is in such case, driven by a generator attached to the gear. Power is provided by the auxiliary Diesel engine system.

The adopting of the stern-fishing method and the expansion of vessel freezing and processing facilities has brought a range of new appliances and innovations to trawling vessels. Stern-trawlers built at Gdynia are provided with a system of hydraulically-controlled blocks and fish chutes. Freezing installations on Polish trawlers include both horizontal plate freezers and blast-freezing tunnels. Some trawlers are equipped with conveyers for transferring frozen fish blocks to storage holds. Unloading conveyers have also been tried. Partitions of polyester laminates have been applied in fish holds recently. This saves weight and facilitates loading and unloading.

Small Fishing Vessels: In the early post-war period, Polish shipyards concentrated on small fishing cutters. Several types of small fishing vessels are still being built at "ship-repair" yards at Szczecin and Gdynia.

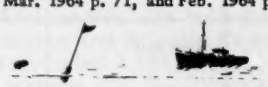
Four small side trawlers (of the "Storem" type) are being built at Szczecin for Indian owners. The specifications of the vessels are: length overall 17.6 meters (57.7 feet), length between perpendiculars 15.0 meters (49.2 feet), and deadweight tonnage 17.5 tons. The insulated fish hold has a capacity of 28.3 cubic meters (1,000 cubic feet). Each of the vessels is equipped with a 180-horsepower Diesel engine which provides a speed of 9 to 9.5 knots.

The "B-25-S" side-trawler (evolved from earlier "super" cutters) is built at Gdynia. The specifications of the "B-25-S" are: length overall 24.6 meters (80.7 feet), length between perpendiculars 21.85 meters (71.7 feet), deadweight tonnage (including fishing gear) 105 tons, and fish-hold capacity 100 cubic meters (3,531.5 cubic feet). The vessel has a 225-horsepower Diesel engine, a speed of 10 knots and an operating range of 3,500 miles. It usually carries a 9-man crew.

Polish shipyards have also started building the newly designed "T-27" small stern-trawler. The main specifications of the "T-27" are length overall 27.5 meters (90.2 feet) and length between perpendiculars 23.7 meters (77.7 feet). Propulsion is by a 450-horsepower Diesel engine with gear and adjustable propeller which drives the vessel at about 11 knots. The "T-27" can remain at sea about 20 days with its standard fuel tank with a capacity of 40 cubic meters (1,412.6 cubic feet). The fish hold, which has a capacity of about 135 cubic meters (4,767.5 cubic feet), is cooled to about 0° C. (32° F.). The power plant and hydraulic trawl winches are controlled from the wheel house. The vessel can be equipped with machinery for preliminary fish processing such as heading fish and grinding fish waste.

Another newly designed Polish vessel is the "K-17" small seiner. The main specifications of the vessel are: length overall 19.6 meters (64.3 feet), length between perpendiculars 16.8 meters (55.1 feet), and fish-hold capacity 40 cubic meters (1,412.6 cubic feet). Propulsion is by a 230-horsepower Diesel engine with gear and adjustable propeller. Using full power, the vessel's operating range is 6 days on its standard 40-cubic-meter (1,412.6 cubic feet) fuel tank. Service speed is 9.5 knots.

Note: See Commercial Fisheries Review, June 1964 p. 55, May 1964 p. 71, Mar. 1964 p. 71, and Feb. 1964 p. 80.



Senegal

FOUR TUNA VESSELS TO BE PURCHASED FROM BRITISH:

A £500,000 (US$1.4 million) Bank of England loan to Senegal for the acquisition of four 30-meter (98 feet) steel-hulled tuna vessels was confirmed by an agreement between the Government of Senegal and Great Britain. The agreement was signed June 15, 1964, by Senegal's Minister of Plan and the British Ambassador to that country. (United States Embassy, Dakar, July 22, 1964.)

South Africa Republic

TUNA VESSEL DELIVERS GOOD CATCHES:

About 100 short tons of tuna with an ex-vessel value of about R28,000 (US$39,200) was landed June 5, 1964, at Table Bay (Cape west coast) by the 108-foot refrigerated tuna vessel Marinette. That was the vessel's best catch since she began fishing for tuna in 1963 after conversion from cargo-hauling work. (The Marinette had delivered a previous record catch of 60 tons earlier in 1964.) The June tuna delivery was taken during a 21-day long-lining trip. During 3 days of the trip, the Marinette was assisted by a catcher vessel. Plans call for the Marinette to be assisted during future trips by two 45-ton catcher vessels--the Vollendam and the Bressa. With the assistance of the catcher vessels, the Marinette should be able to cut the length of her fishing trips down to about 10 days. All 3 vessels, however, are equipped to spend 40 days at sea. The Marinette has a crew of 4 officers and 16 men, and each catcher vessel has a skipper and a crew of 8. (The South African Shipping News and Fishing Industry Review, June 1964.)

Note: See Commercial Fisheries Review, March 1964 p. 67 and Nov. 1963 p. 78.

* * * * *

NEW ANCHOVY FISHERY MAY DEVELOP RAPIDLY:

Five South African fishing vessels caught 7,800 short tons of anchovy off the Cape west coast during April-May 1964. During that period, the anchovy fishery was limited to vessels equipped with the special ½-inch mesh knotless purse-seine nets imported for experimental purposes. Rapid expansion is expected in the fishery, however, as more nets--costing about R8,000 (US$11,200) each--are imported. It is expected that 3 anchovy nets will be imported by each of 14 fish meal factories in the South Africa Republic.

Large shoals of anchovy have been seen off Walvis Bay in South-West Africa, according to the Namib Times. It is believed that South-West African fish meal factories will also be allowed to import a limited number of the anchovy nets, raising the total number of anchovy nets in South Africa to over 50 and the total investment in the nets to over R400,000--or $560,000. (The South African Shipping News and Fishing Industry Review, June 1964.)

Notes: (1) South African rand 1.00 equals US$1.40.
(2) See Commercial Fisheries Review, Aug. 1964 p. 84.

* * * * *

PRODUCTION OF LEADING PROCESSED FISHERY PRODUCTS, 1962-1963:

In 1963, record production of fish meal at Walvis Bay in the Territory of South-West Africa offset a modest decline in fish meal output on the Cape west coast of South Africa. On the other hand, South African canned fish production was down sharply in 1963 at both Walvis Bay and Cape west coast factories.

In spite of the decline in output in 1963, South African canned fish production continued to yield a large export surplus. Domestic consumption of the 3 leading South African canned fishery products (pilchards, maasbanker, and mackerel) in 1963 amounted to 14,400 short tons (mainly pilchards), or only 32.5 percent of total output. (United States Consulate, Cape Town, September 4, 1964; and other sources.)

* * * * *

Production of Leading Processed Fishery Products in the South Africa Republic and the Territory of South-West Africa, 1962-1963

Product	Unit	South Africa		South-West Africa		Total South Africa and South-West Africa	
		1963	1962	1963	1962	1963	1962
Canned:							
Pilchard	Short tons	8,445	7,344	32,053	66,712	40,498	74,056
Maasbanker	" "	2,090	9,595	-	-	2,090	9,595
Mackerel	" "	1,719	3,947	-	-	1,719	3,947
Total	Short tons	12,254	20,886	32,053	66,712	44,307	87,598
Cured & Salted:							
Maasbanker	Short tons	1,959	5,000	-	-	1,959	5,000
Industrial:							
Fish meal	Short tons	111,068	126,000	1/140,000	98,773	251,068	224,773
Fish-body oil	1,000 imp. gals.	6,765	8,295	1/4,500	1/4,000	11,265	12,295
Whale oil	Long tons	5,886	5,892	-	-	5,886	5,892
Sperm oil	Long tons	10,780	10,283	-	-	10,780	10,283
Seal oil	1,000 imp. gals.	16	1/16	63	39	79	55

1/Estimated.

FISHERIES CATCH, 1963:

The pilchard catch taken in the pelagic shoal fishery made up the bulk of the 1963 fisheries catch in the South Africa Republic and the Territory of South-West Africa. Landings of spiny lobster, hake, and snoek contributed substantially to the value of the 1963 catch. The newly developed tuna fishery in South Africa yielded a catch of 2,500 tons valued at R300,000 (US$417,000) in 1963 (see table).

South Africa Fisheries Catch and Ex-Vessel Value, 1963

Catch by Fishery and Species	Republic of South Africa			Territory of South-West Africa			Total South Africa and South-West Africa Combined		
	Quantity	Value		Quantity	Value		Quantity	Value	
	Short Tons	R1,000	US$1,000	Short Tons	R1,000	US$1,000	Short Tons	R1,000	US$1,000
Trawl Fishery:									
Hake	75,175	3,817.3	5,306.0	-	-	-	75,175	3,817.3	5,306.0
Spiny lobster 1/	106	66.3	92.2	-	-	-	106	66.3	92.2
Other species	2/37,193	2/1,310.4	1,821.5	1,055	130.0	180.7	38,248	1,440.4	2,002.2
Total trawl fishery	112,474	5,194.0	7,219.7	1,055	130.0	180.7	113,529	5,324.0	7,400.4
Pelagic Shoal Fishery:									
Pilchard	441,943	3/3,942.1	5,479.5	602,000	4/5,177.2	7,196.3	1,043,943	9,119.3	12,675.8
Maasbanker	26,400	3/235.5	327.3	-	-	-	26,400	235.5	327.3
Mackerel	14,824	3/132.2	183.8	-	-	-	14,824	132.2	183.8
Total pelagic shoal fishery	483,167	3/4,309.8	5,990.6	602,000	4/5,177.2	7,196.3	1,085,167	9,487.0	13,186.9
Other Line and Net Fisheries:									
Snoek	4,500	5/900.0	1,251.0	2,250	5/270.0	375.3	6,750	1,170.0	1,626.3
Tuna (dressed weight)	2,500	6/300.0	417.0	-	-	-	2,500	300.0	417.0
Dogfish and other shark	2,500	7/	7/	-	-	-	2,500	7/	7/
Total other line and net fisheries	9,500	1,200.0	1,668.0	2,250	270.0	375.3	11,750	1,470.0	2,043.3
Shellfish Fishery:									
Spiny lobster (whole)	9,300	5/2,790.0	3,878.1	8,021	5/1,600.0	2,224.0	17,321	4,390.0	6,102.1
Abalone (meat only)	3,000	5/900.0	1,251.0	-	-	-	3,000	900.0	1,251.0
Total shellfish fishery	12,300	3,690.0	5,129.1	8,021	1,600.0	2,224.0	20,321	5,290.0	7,353.1

1/Trawler catch off Natal; main South African lobster catch listed below under "Shellfish Fishery."
2/Includes 20,952 tons of offal valued at only $36,709 (US$51,026).
3/Based on season landings price of R7.95 ($11.05) per ton, plus bonus of R0.97 ($1.35) per ton paid at end of season on the basis of international sales results.
4/Based on fixed landings price of R8.60 ($11.95) per ton.
5/Estimated.
6/Based on an average price of R120 ($166.80) per ton.
7/Not available.
Notes: (1) South African rand 1.00 equals US$1.39.
(2) Table does not include whale and seal catch.

Part of the Cape Town fleet engaged in the South African spiny lobster fishery.

South African whalers took 4,455 whales from the Indian and Atlantic Oceans in 1963. That total included 2,651 sperm whales and 1,092 sei whales.

In 1963, the Territory of South-West Africa reported a seal catch of 42,412 pups and 3,391 bulls, and the South Africa Republic reported a seal catch of 6,749 pups and 2,109 bulls. (United States Consulate, Cape Town, August 25, 1964.)

* * * * *

DOMESTIC CONSUMPTION OF LEADING PROCESSED FISHERY PRODUCTS, 1963:

Although exports are the major factor in the South African fishing industry, domestic consumption of some products is also sub-

South Africa Republic (Contd.):

stantial. The domestic market absorbs the bulk of South African production of fresh, frozen, and cured finfish products. A considerable quantity of canned fish and frozen spiny lobster tails is also consumed locally.

Domestic Consumption of Leading Processed Fishery Products Prepared in the South Africa Republic and the Territory of South-West Africa, 1963

Product	Unit	Quantity
Canned pilchards, maasbanker, and mackerel	Short tons	1/14,400
Canned spiny lobster	" "	2/2.5
Frozen spiny lobster tails	" "	2/250
Fresh, frozen, and cured finfish	" "	2/77,500
Industrial Products:		
Fish meal	" "	28,000
Whale meat meal	Long tons	700
Fish-body meal	" "	10,500
Whale oil	" "	1,000
Sperm oil	" "	200

1/Consists of 800,000 cases.
2/Estimated.

Among the industrial products, domestic consumption accounted for only about 11 percent of total South African production of fish meal. Fish-body oil, whale oil, and sperm oil are also produced primarily for export markets.

The South Africa Republic imports only a small quantity of edible and industrial fishery products for the domestic market. (United States Consulate, Cape Town, September 4, 1964.)

* * * * *

FIBERGLASS VESSEL SUCCESSFUL IN PILCHARD FISHERY:

The 67.5-foot fiberglass vessel Western Dawn was reported to be having a good season in the 1964 pilchard fishery off the Cape west coast of South Africa. The "sandwich" principle was used in constructing the hull when the vessel was built in 1963. Since then the hull has withstood all tests. There was no sign of wear even after the vessel unloaded in heavy weather. In mid-1964 the vessel brought in a catch of 124 short tons in bad weather. The only maintenance the hull requires is a semiannual removal of marine growths and a yearly underwater inspection.

The vessel is equipped with fish-finding and echo-sounding equipment, power block, and hydraulic steering with control positions in the wheelhouse and in the bow. Powered by a 220-horsepower Diesel engine, the vessel has a speed of 11 knots, making it one of the fastest vessels in the South African fishing fleet. (The South African Shipping News and Fishing Industry Review, June 1964.)

Note: See Commercial Fisheries Review, Nov. 1963 p. 79.

Taiwan

ITALY AND TAIWAN TO SIGN FISHERY COOPERATION AGREEMENT:

Taiwan and Italy were expected to sign a fishery cooperation agreement, according to a foreign dispatch from Taipei. Under that agreement, the Taiwan Nationalist Government will sell tuna to Italy and will use the payments to build tuna vessels in Italy.

Taiwan's current annual tuna production is reported to be around 6,000 metric tons, of which half is exported to foreign countries. The Nationalist Government is building thirteen 300-ton vessels and three 1,000-ton tuna vessels with loans obtained from the World Bank. Upon completion of those vessels, Taiwan's annual tuna production is expected to increase to 10,000 tons. (Minato Shimbun, August 28, 1964.)

U.S.S.R.

FISHERY LANDINGS IN 1964 EXPECTED TO SURPASS CATCH TARGET:

Soviet fisheries landings (fish, shellfish, and whales) in 1964 will probably exceed the 4.9-million-metric-ton catch target established for the year. The total Soviet catch during the first quarter of 1964 was 7 percent higher than in the same period of 1963. (Rybnoe Khoziaistvo, No. 6 (1964), and other sources.)

Some of the Soviet Far Eastern fishing fleets reported total landings during the first 8 months of 1964 which exceeded those made during the same period in 1963 by 25-35 percent and exceeded the planned catch by 15 to 25 percent. In August 1964, the Soviet Atlantic catch was also reported to be considerably above the planned catch. Since Atlantic and Pacific fisheries landings make up almost three-fourths of all Soviet landings, it can be estimated that by

U.S.S.R. (Contd.):

the end of 1964 Soviet fisheries landings will probably be about 10 percent higher than planned. That would give the Soviet Union a total 1964 catch approaching 5.5 million tons, an all-time record.

* * * * *

FISHERY DEVELOPMENTS:

According to a Soviet press release, dated August 1, 1964, the U.S.S.R. Fisheries Bureau chief of Kaliningrad, one of the major Baltic Sea fishing ports in the Soviet Union, stated that a total of 232 Soviet vessels (comprising the Soviet Atlantic fishing fleet based at Kaliningrad) were operating in the Atlantic Ocean as of August 1964. The Kaliningrad fleet reportedly consists of 201 fishing vessels, 8 factoryships, 14 freezerships, 7 tankers, and 2 towed vessels.

Another Soviet press report, dated August 18, indicates that Soviet and Cuban researchers are conducting joint fishery investigations in the Caribbean Sea aboard a Soviet research vessel. (Suisancho Nippo, August 26, 1964.)

* * * * *

TEN FREEZER-TRANSPORT VESSELS BUILT IN SWEDEN FOR SOVIET FISHING FLEET:

Sudoimport, Moscow, ordered 10 freezer-transport fishery vessels from shipyards in Goteborg, Sweden, in 1963. Six of those vessels had been launched by mid-1964, including 2 which were built under subcontract at a shipyard in Uddevalla, Sweden (see table). The new vessels will freeze, store, and transport fish for the Soviet fishing fleet. The refrigerated areas of the vessels are designed to maintain a temperature of -30 C. (-22° F.). For loading and unloading, the vessels are equipped with endless conveyor belts. At the launching of the Kamchatskie Gory, it was reported that the vessel's loading equipment would be capable of handling 800 tons in 18 hours. Processing equipment is not being installed on the vessels at the Swedish shipyards.

Sudoimport also ordered two floating docks from a shipyard in Goteborg, Sweden, in 1963. One of the floating docks was completed in the summer of 1964 and towed to its destination at Novorossijsk on the Black Sea, where it is being used in vessel repair work. The floating dock has a lifting capacity of 27,000 tons and can accommodate vessels up to about 45,000 tons deadweight in drydock. The floating dock has a length of 218 meters (715 feet) and a width of 40.5 meters (133 feet). Accommodations are provided for about 30 men. The dock develops its own electric power from a 15,000-kilowatt station. The second dock is under construction.

The launching of the freezer-transport Carl Linne in June 1964 coincided with the visit of the Soviet Premier to Sweden. During his visit to Goteborg, the Soviet Premier stated that 152 vessels were being built abroad for the Soviet Union and that 60 of those would be launched in the summer of 1964.

Delivery Schedule and Specifications of Ten Freezer-Transport Fishery Vessels Ordered by Sudoimport from Swedish Shipyards in 1963

Construction Site	Name of Vessel	Launching Date	Scheduled Year of Delivery	Approximate Specifications
Goteborg	Priboj	February 14, 1964	1964	Length, overall--515 feet Beam, molded--69.5 feet Dead weight tonnage--about 7,800 tons Refrigerated cargo capacity--451,400 cubic feet Speed, loaded--17.5 knots Power--8,750 hp. at 112 r.p.m. Refrigerated areas designed to maintain a temperature of -30° C. (-22° F.)
"	Khibinskie Gory	April 14, 1964	-	
"	Carl Linne	June 24, 1964	-	
"	1/	1/	-	
Uddevalla	Krymskie Gory	April 23, 1964	-	
"	Uraljskie Gory	June 26, 1964	1964	
Goteborg	Kamchatskie Gory	May 5, 1964	1964	Length, overall--497 feet Beam, molded--67 feet Dead weight tonnage--about 8,000 tons. Refrigerated cargo capacity--450,000 cubic feet Speed--17 knots Power--8,750 hp. at 112 r.p.m.
"	Sahalinskie Gory	1/	1965	
"	Sajanskie Gory	1/	-	
"	Altajskie Gory	1/	1965	

1/Not available.

(United States Consul, Goteborg, August 13, 1964.)

* * * * *

U.S.S.R. (Contd.):

CONSTRUCTION OF FACTORYSHIP FOR NORTH PACIFIC NEAR COMPLETION:

The eighth Soviet factoryship of the Zakharov class being constructed at the Leningrad Admiralty Shipyard is nearing completion. It is named the Mikhail Tukhachevskii and is designed for use as a cannery as well as for manufacture of fish meal and oil. The new vessel will have a displacement of about 16,000 gross tons, is 538 feet long, and will have a crew of about 600 (40 less than the first vessel of this type).

This new Soviet factoryship will be used in the Pacific with the rest of the Zakharov fleet; the factoryships process crab meat off Alaska in the spring and saury off the Kuriles in late summer and the fall. It is reported that reductions in personnel on those vessels have been made possible by additional automation of production lines. An earlier Soviet report indicated that the number of personnel may be reduced by 115 persons by the time the final vessel of this series is completed.

United Kingdom

REPORT ON FISH BOXED AT SEA:

The British trawler Arlanda landed 30 boxes of cod and haddock at the port of Fleetwood early in August 1964. On the Icelandic fishing grounds, the fish had been stored in metal boxes soon after it was caught as part of experiments being carried out by the Industrial Development Unit of the White Fish Authority. Similar tests in boxing fish at sea were carried out at the fishing port of Hull in December 1963 but this was the first one at Fleetwood.

From a scientific point of view the Arlanda experiment was considered a success, but there were other factors to consider including the important one of cost. It took longer to box the fish than to stow it in the traditional way and this made it a more costly operation. The boxes were numbered, indicating when the fish were caught--during the early part of the trip or toward the end.

There was little doubt, said a White Fish Authority spokesman, that the boxed fish was superior in quality to similar fish caught at the same time. This view was endorsed by a spokesman for the wholesale firm which bought the fish and was cooperating in the tests. He said that even the 15-day-old fish was in first-class condition, and that it filleted well, and the weight was good.

The boxed fish was sent to Birmingham, where it was sold in retail fish stores. The store managers were asked to make a note of which customers bought the fish, and they were asked to give a report on its quality and taste when it was cooked. In this way it was possible to keep a check on the fish from the sea to the table to find out, among other things, how it kept.

The owners of the Arlanda said that they had been happy to cooperate in the experiment. It was probable that more tests of a similar nature would be carried out aboard the trawler. The opinion of the vessel owners was that Fleetwood had always been noted for its high quality fish and anything which could be done to maintain or improve the quality was worth trying.

These tests by the White Fish Authority with the cooperation of trawler owners in Hull and Fleetwood have demonstrated that boxing fish at sea in distant-water trawlers would have a number of important advantages, according to a report issued in mid-August 1964.

The report states that this method of stowing the catch is common practice in certain sections of the inshore fleet and in one trawler fleet fishing near and middle waters, but although it has been advocated for many years by the Torry Research Station it has not hitherto been used in the distant-water fleet.

Among the advantages are improved quality of catch, absence of damage during discharge, ease of discharge, avoidance of mixing fish caught on different days, and improved fillet yields. The fish can remain undisturbed in ice until the time of filleting, and this should give a further improvement in "shelf life," especially in summer.

The results have been sufficiently good to justify the planning of a full-scale test in a trawler yet to be selected. The main purpose will be to establish whether the problems of handling large quantities of boxes, and of sorting the catch, can be overcome in a distant-water trawler. It is believed that if the fish hold is modified specifically for boxing, the crews will find little difficulty in the new methods.

United Kingdom (Contd.):

In the tests so far carried out fish were stowed in boxes at various stages in the trip while other fish caught at the same time were stowed in the conventional manner, either by bulking or by shelfing.

Comparisons made by the Torry taste panel, port inspectors, and members of the trade indicated an improvement of 1 to 1½ days in "shelf life" for early-caught cod and haddock stowed in boxes. Improvements in fillet yield of up to 5 percent have been measured, while wastage due to hook damage is completely eliminated.

Measurements indicate that the likely variation in weight of fish in a given number of boxes can be predicted, and that with wide experience a fairly constant weight can be achieved by the crews.

The main deterrent to the trawler owner may therefore be the cost of modifying the hold and of providing the boxes. Since the method appears to have a number of advantages for the wholesale merchant and processor, some of which are directly measurable in financial terms, it would seem reasonable for him to encourage the adoption of the new method by passing on some of the benefits in the form of slightly higher auction prices.

Improvement in quality is possible only if the design of the box and the method of packing the fish and ice follow very closely the requirements laid down by the Torry Research Station; for example, the drainage from one layer of boxes should not pass through the fish and ice in the layer below. To design suitable boxes which at the same time avoid waste of hold space to an unacceptable degree, and which when empty can be "nested" so as to provide room for working and for ice, is difficult.

The specification prepared by the Authority's Industrial Development Unit took all those factors into account and attractive designs in both light alloy and plastic have been put forward by specialist manufacturers. The first full-scale tests will employ light alloy boxes since production runs of plastic boxes are economical only when the design has been finally proved and accepted. (Fish Trades Gazette, August 8 and 22, 1964.)

* * * * *

SALMON AND TROUT FARMING METHOD DEVELOPED IN NORWAY ATTRACTS INTEREST:

In July 1964, a large British firm announced that it had acquired rights to use a Norwegian method for breeding and rearing salmon and trout. The new salmon farming technique was developed by two experimenters in Sykkylven, Norway. Under the Norwegian method, baby salmon and trout are periodically transferred to ponds of gradually increased salinity as they develop, thus introducing them to salt water at a much earlier stage than under natural conditions. It has been said that trout can develop from the egg to a size of 5 pounds within 2-1/2 years under the new rearing method.

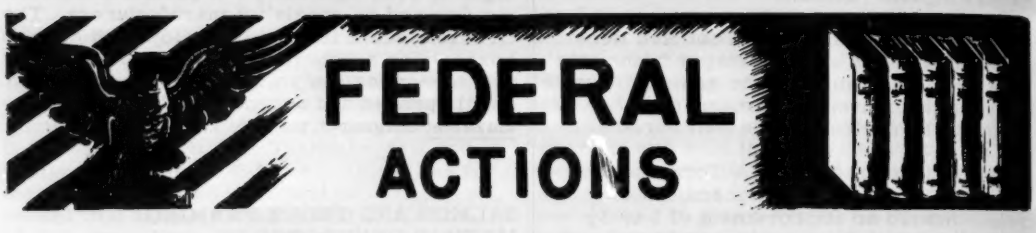
The Norwegian experiments have already aroused considerable interest in Scotland, as several people who have been to Sykkylven have established similar fish farms in the Scottish lochs. One such venture (now in its second year of operation at Loch Sween) has a stock of 250 salmon and 6,000 rainbow trout.

The possibility of establishing a large-scale commercial fish farm to rear salmon and trout is being studied by the North of Scotland Hydro-Electric Board, with the aim of finding a solution to some of the social and economic problems of the Highlands and helping to counteract the present drift of population from the area. The British firm which has acquired rights to the new fish-breeding method is also said to be considering the Scottish lochs as likely areas for the development of their project. (Fish Trades Gazette, London, July 11, 1964.)

* * * * *

FIRST SHIPMENT OF SMOKED SHARK FILLETS MARKETED:

Smoked shark fillets made their first appearance in Britain when they were offered as a delicacy by London's Billingsgate market in July 1964. The marketing venture is being watched with interest by fishermen at the port of Looe, Cornwall (southern England), where as many as 6,000 sharks are landed in a good year. A fishermen's representative at Looe strongly recommended the shark fillets: "It is very nice to eat, but very sweet." He indicated, however, that a new name for the product would aid marketing prospects. (Fish Trades Gazette, July 25, 1964.)



Civil Service Commission

EDUCATIONAL REQUIREMENTS FOR FEDERAL OCEANOGRAPHERS:

Minimum educational requirements for Federal positions in the Oceanographer Series, GS-1360-0, have been established by the Civil Service Commission and published in the Federal Register of August 28, 1964. Stating the reasons for the requirements, the Civil Service Commission said, in part, "The duties of these positions cannot be performed successfully without formalized training either in oceanography or in a combination of the basic physical sciences which provide fundamental scientific knowledges applicable or adaptable to exploring, examining, and understanding ocean phenomena. . . ."

Complete details of the educational requirements for Federal oceanographer positions as published follow:

CIVIL SERVICE COMMISSION

OCEANOGRAPHERS

Minimum Educational Requirements

In accordance with section 5 of the Veterans' Preference Act of 1944, as amended, the Civil Service Commission has decided that minimum educational requirements are necessary for positions in the Oceanographer Series, GS-1360-0. These requirements, the duties of the positions, and the reasons for the Commission's decision that these requirements are necessary are set forth below.

OCEANOGRAPHER SERIES, GS-1360-0

(ALL GRADES)

Minimum educational requirements. For Oceanographer positions, all grades, applicants must have successfully completed requirements in A, B, or C below:

A. A full four-year course of study in an accredited college or university leading to a bachelor's degree with major study in oceanography, physics, chemistry, mathematics, geophysics, meteorology, or earth science. The completed study must have included at least 24 semester hours in any combination of oceanography, physics, chemistry, and mathematics if it has included courses in differential and integral calculus.

B. At least 24 semester hours of oceanography, physics, chemistry, and mathematics if it has included courses in differential and integral calculus, in an accredited college or university, combined with pertinent work experience in the field of oceanography totaling four years of education and experience. This combination of education and experience must have provided the applicant with the equivalent of four years of education comparable in type, scope and thoroughness to that required under paragraph A above. The work experience must have been of such a nature as to demonstrate that the applicant can perform the professional work of oceanography.

C. The successful completion of a full four-year curriculum of study in an accredited college or university leading to a bachelor's degree with major study in geology, engineering, or a biological science may be accepted in lieu of the above educational requirement, provided that (a) the candidate demonstrates a good knowledge of oceanography, (b) the candidate has at least one year of professional experience or training in oceanography or a closely allied field; and (c) the total education and experience clearly demonstrate possession of those knowledges and abilities required for performance of the work of the position to be filled. The completed study must have included at least 24 semester hours in any combination of oceanography, physics, chemistry, and mathematics if it has included courses in differential and integral calculus.

The foregoing requirements of "a good knowledge of oceanography" typically involve one of the following:

(1) Undergraduate or graduate courses in oceanography; or

(2) Graduate-level courses in mathematical, biological or physical sciences, supplemented by experience or independent study in oceanography; or

(3) Research or survey experience, e.g., as a biologist, geologist, or engineer, which involved intensive investigation of problems in oceanography.

For positions engaged in basic and/or applied research, applicants must have successfully completed a full four-year course of study, in an accredited college or university, leading to a bachelor's or higher degree in an appropriate field of science as described in paragraph A or C.

Duties. Oceanographers plan and conduct scientific surveys, and examine selected ocean data at sea or on land; they collect, analyze, evaluate, coordinate and interpret information derived

both scientifically and empirically from the ocean and its surroundings. Some oceanographers plan, organize, conduct and administer basic and applied research in laboratories at sea and on land. In general, these scientists are concerned with research on and studies of tides, sea ice, currents, waves and other ocean events in terms of their temperatures, densities, circulation, motion, sound propagation, transparency, and similar characteristics. They are also concerned with the interaction and relationships between the ocean bottom, sea and atmosphere, including animal or plant life in the ocean, as these affect the particular ocean phenomena under study.

Reasons for the requirements. The duties of these positions cannot be performed successfully without formalized training either in oceanography or in a combination of the basic physical sciences which provide fundamental scientific knowledges applicable or adaptable to exploring, examining, and understanding ocean phenomena. Oceanographer at the minimum must have a thorough knowledge of basic scientific methods and procedures which may be adapted to oceanographic work. Appointees must have the ability to apply their professional and scientific knowledge to their work in order to solve specific problems, interpret and apply the results of research (both in oceanography and in the applicable basic sciences), or do oceanographic research. These knowledges can be acquired only through the successful completion of a directed course of study in an accredited college or university which has scientific libraries, well equipped laboratories, and thoroughly trained instructors who can evaluate the progress of the professional and scientific training competently.

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] MARY V. WENZEL,
Executive Assistant to the Commissioners.

Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

TECHANICAL ASSISTANCE PROJECT IN ALASKA TO AID EARTHQUAKE-DAMAGED AREAS:

Approval of a $13,000 technical assistance study to help generate permanent jobs in earthquake-damaged communities in Alaska was announced September 1, 1964, by the Area Redevelopment Administration (ARA) of the U.S. Department of Commerce.

Cities to be surveyed by the 10-week project include Anchorage, Kodiak, Seward, Cordova, and Valdez. The Alaska State Department of Economic Development requested the project on an urgent basis to help provide permanent jobs for reconstruction workers when their present rebuilding jobs are completed.

The primary objective of the study will be the identification of specific development opportunities for new and established industries. A survey team consisting of specialists from two firms in Washington, D. C., will evaluate problems and potentials in each of Alaska's resource fields and recommend primary industries with the best capabilities for development. A list of priorities will also be established for further and more intensive study.

Department of the Interior

FISH AND WILDLIFE SERVICE

REVISED STANDARDS FOR GRADES OF FROZEN FISH BLOCKS:

Revised standards for grades of frozen fish blocks became effective October 9, 1964, after publication in the Federal Register, September 9, 1964, by the U.S. Department of the Interior. The revised standards were issued as an amendment to Part 263 of Title 50, Code of Federal Regulations, and supersede the standards that have been in effect since July 1958. The revised standards reflect a higher quality product through a general tightening of the critical quality factors as compared to the old standards.

The standards are used by industry in buying fish blocks from foreign sources for use in the manufacture of Grade A fish portions and fish sticks.

Following are the revised standards for grades of frozen fish blocks as published in the Federal Register, September 9, 1964:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 263—UNITED STATES STANDARDS FOR GRADES OF FROZEN FISH BLOCKS

On page 7568 of the FEDERAL REGISTER of June 12, 1964, there was published a

notice and text of a proposed amendment of Part 263—United States Standards for Grades of Frozen Fish Blocks—of Title 50, Code of Federal Regulations.

Interested persons were given until July 13, 1964, to submit written comments, suggestions or objections with respect to the proposed revised part. No responses to the proposal were received. The proposed revised part is hereby adopted without change and is set forth below.

The revised part is issued pursuant to sections 203 and 205 of Title II of the Agricultural Marketing Act of 1946, 60 Stat. 1087 (1946), 7 U.S.C. 1622 and 1624 (1958) as transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of 1956, 70 Stat. 1122 (1956), 16 U.S.C. 742e (1958).

This part shall become effective at the beginning of the 30th calendar day following the date of this publication in the FEDERAL REGISTER.

STEWART L. UDALL,
Secretary of the Interior.

SEPTEMBER 2, 1964.

PART 263—UNITED STATES STANDARDS FOR GRADES OF FROZEN FISH BLOCKS [1]

Sec.
263.1 Product description.
263.2 Grades of frozen fish blocks.
263.11 Determination of the grade.
263.21 Definitions.
263.25 Tolerances for certification of officially drawn samples.

AUTHORITY: The provisions of this Part 263 issued under sec. 6, 70 Stat. 1122; 16 U.S.C. 742e; and secs. 203 and 205, 60 Stat. 1087, 1090, as amended; 7 U.S.C. 1622, 1624.

§ 263.1 Description of the product.

Frozen fish blocks are rectangular-shaped masses of cohering frozen fish flesh of a single species. They consist of adequately drained whole, wholesome fillets or pieces of whole, wholesome fillets cut into small portions but not ground or comminuted; and they are frozen and maintained at temperatures necessary for the preservation of the product. Frozen fish blocks are made in two styles.

(a) *Style I—skinless fish blocks.* Fish blocks that have been made from skinless fillets.

(b) *Style II—skin-on fish blocks.* Fish blocks that have been made from demonstrably acceptable skin-on fillets.

§ 263.2 Grades of frozen fish blocks.

(a) "U.S. Grade A" is the quality of frozen fish blocks that (1) possess a good flavor and odor and that (2) have a total score of 85 to 100 points for those factors that are rated in accordance with the scoring system outlined in this part.

(b) "U.S. Grade B" is the quality of frozen fish blocks that (1) possess at least a reasonably good flavor and odor and that (2) have a total score of 70 to 84 points for those factors that are rated in accordance with the scoring system in this part.

(c) "Substandard" is the quality of frozen fish blocks that meet product description but fail to meet the requirements of U.S. Grade B.

[1] Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

§ 263.11 Determination of the grade.

The grade is determined by examining the product in the frozen, thawed, and cooked states and is evaluated by considering the following factors:

(a) *Factors rated by score points.* Points are deducted for variation in the quality of each factor in accordance with the schedule in table 1. The total of points deducted is subtracted from 100 to obtain the score. The maximum score is 100; the minimum score is 0.

(b) *Factors not rated by score points.* The factor of "flavor and odor" is evaluated organoleptically by smelling and tasting the product after it has been cooked in accordance with § 263.21(c).

(1) Good flavor and odor (essential requirements for a Grade A product) means that the cooked product has the typical flavor and odor of the indicated species of fish and is free from rancidity, bitterness, staleness, and off-flavors and off-odors of any kind.

(2) Reasonably good flavor and odor (minimum requirements of a Grade B product) means that the cooked product is lacking in good flavor and odor but is free from objectionable off-flavors and off-odors of any kind.

§ 263.21 Definitions.

(a) *Examination of sample, frozen state.* (1) Color refers to reasonably uniform color characteristic of the species used. Deviations from normal color include noticeable yellowing and/or rusting of the fish surface.

(2) Dehydration refers to loss of moisture from the fish surfaces during frozen storage. Moderate dehydration is color-masking and can easily be scraped off with a fingernail. Excessive dehydration is deep color-masking and requires a knife or other hard instrument to scrape it off.

(3) Uniformity of size refers to the degree of conformity to the declared size. A deviation is considered to be any deviation from stated length, width or thickness, or from the average dimensions if no dimensions are stated. Only one deviation from each dimension may be assessed. Two readings for length, three readings for width, and four readings for thickness will be measured.

(4) Uniformity of weight refers to the degree of conformity to the weight. Only underweight deviations are assessed.

(5) An acceptable edge angle is an angle formed by two adjoining surfaces whose apex is within 3/8 inch of a carpenter's square placed along the surfaces. For each edge angle, three readings will be made and at least two readings must be acceptable for the whole edge angle to be acceptable. An acceptable corner angle is an angle formed by 3 adjoining surfaces whose apex is within 3/8 inch of the apex of a carpenter's square placed on the edge surfaces. Unacceptable angles fail to meet these criteria.

(6) Improper fill refers to surface and internal air or ice voids, ragged edges, or damage. It is measured as the number of 1-ounce units that would be adversely affected when the block is cut. For this purpose, the 1-ounce unit is considered to be 4 x 1 x 3/8 inch.

(b) *Examination of the product, thawed state.* (1) Blemishes refer to a piece of skin, scale, a blood spot, a fin, a bruise, a black belly lining, a piece of nape membrane or a harmless piece of extraneous material. One "piece of skin" consists of one piece 1/2 square inch in area; except that for skin patches larger than 1 square inch, an additional instance shall be assessed for each additional 1/2 square inch in area. "Blood spot" is one of such size and degree as to be considered objectionable. A "piece of black belly lining" is any piece longer than 1/2 inch. "Fin" is one fin or one identifiable part of a fin. A piece of nape membrane consists of one piece 1/2 square inch in area or larger. "Scales" are aggregates of one or more scales of such degree as to be considered objectionable. Skin is not to be considered a blemish on Style II block. Blemishes are measured on a 5-pound portion cut from the edge of the fish block and thawed.

(2) "Bones" refers to any potentially harmful bones in the fish block. A potentially harmful bone is one that after being cooked is capable of piercing or hurting the palate. One instance of bones means one bone or group of bones occupying or contacting a circular area of 1 square inch. Bones are measured on the same 5-pound thawed portion cut from the fish block.

TABLE 1—SCHEDULE OF POINT DEDUCTIONS PER SAMPLE UNIT

State	No.	Factors scored	Aspects determining score	Deduct
Frozen	1	Color	Small degree: Moderate yellowing Large degree: Excessive yellowing and/or rusting	4 10
	2	Dehydration	Minor: Moderate dehydration for each 10 percent of surface area affected. Major: Excessive dehydration for each 10 percent of surface area affected.	3 6
	3	Uniformity of size	Minor: Each deviation from declared size in length, width, or thickness ±1/4 to 1/2 inch. Major: Each deviation from declared size in length, width, or thickness over ±1/4 inch.	3 6
	4	Uniformity of weight	Minor: Any minus deviation from declared weight of more than 1 ounce but not more than 4 ounces. Major: Any minus deviation from declared weight more than 4 ounces.	3 8
	5	Angles	Edge angle—2 out of 3 readings deviating 3/4 inch. Corner angle—each angle deviating 3/4 inch.	2
	6	Improper fill	For each 1 ounce unit cut from the block that would be adversely affected due to air spaces, ice spaces, depressions, ragged edges, damage, or imbedded packaging material.	1
Thawed	7	Blemishes	Each blemish in 5 pounds of fish block	2
	8	Bones	Each instance of bones in 5 pounds of fish block	5
Cooked	9	Texture	Small Degree: Moderately tough, dry, rubbery, or mushy... Large Degree: Excessively tough, dry, rubbery, or mushy...	5 15

(c) *Examination of the cooked product.* (1) Heating in a suitable manner means heating the product in one of two ways, as follows:

(i) Cut three or more portions about 4 by 3 by ½ inches from a frozen block. Wrap them individually or in a single layer in aluminum foil. Place the package portions on a wire rack suspended over boiling water in a covered container. Steam the packaged portions until the product is thoroughly heated, or

(ii) Cut and package the portions as previously described. Place the packaged portions on a flat cookie sheet or shallow flat-bottom pan of sufficient size so that the packages can be evenly spread on the sheet or pan. Place the pan and frozen contents in a properly ventilated oven heated to 400° F. and remove when the product is thoroughly heated.

(2) Texture refers to the condition of the cooked fish flesh. The texture should be firm, slightly resilient, but not tough or rubbery; and should be moist, but not mushy. Deductions for texture will follow the deductions assessed in table 1.

(3) Flavor and odor is evaluated organoleptically as described in § 263.11(b).

(d) *General definitions.* (1) "Demonstrably acceptable" shall mean that the product has been produced commercially and met customer acceptance.

(2) "Adversely affected" shall mean that the unit cut would deviate more than 15 percent plus or minus from 1 ounce.

(3) "Small" (overall assessment) refers to a condition that is noticeable, but is not seriously objectionable.

(4) "Large" (overall assessment) refers to a condition that is not only noticeable, but is seriously objectionable.

(5) "Minor" (measured quantity or area) refers to a defect that affects the appearance or utility of the product or both.

(6) "Major" (measured quantity or area) refers to a defect that seriously affects the appearance or utility of the product or both.

§ 263.25 Tolerances for certification of officially drawn samples.

The sample rates and grades of specific lots shall be certified on the basis of the regulations governing inspection and certification of processed fishery products, processed products thereof, and certain other processed food products.

Second issue. These standards supersede the standards that have been in effect since July 1958.

Note: See Commercial Fisheries Review, August 1964 p. 90.

United States Circuit Court of Appeals

RULING UPHOLDS BREADED SEAFOOD PROCESSOR'S OVERTIME EXEMPTION UNDER FAIR LABOR STANDARDS ACT:

A recent Federal Court of Appeals decision in essence shows that the exemption from the overtime requirements of the Federal Wage and Hour Law is applicable to employees hired in the processing and freezing of breaded fish products, crab cakes, and deviled crabs.

On August 19, 1964, the United States Court of Appeals for the Fourth Circuit upheld a breaded seafood processor's overtime exemption under Section 13(b) (4) of the Fair Labor Standards Act (Wirtz v. Chesapeake Bay Frosted Foods Corp., 16 WH Cases 623, August 19, 1964.) The decision was given in an appeal from a July 26, 1963, ruling by the U.S. District Court for the Eastern District of Virginia (Wirtz v. Chesapeake Bay Frosted Foods Corp., 220 F. Supp. 586--E.D. Va. 1963).

The cases involved the U.S. Labor Department's interpretative rulings (29 CFR, Part 784, Sections 784.110 through 784.112) that processors are not entitled to an overtime exemption for employees engaged in processing fishery products consisting of more than 20 percent nonaquatic matter. An injunction sought by the Labor Department against a breaded seafood processor in Newport News, Va., had raised the issue of whether Labor Department's criterion should apply to breaded oysters, breaded scallops, breaded shrimp, breaded fish sticks and portions, crab cakes, and deviled crabs. (Practically all breaded frozen seafoods must, in order to be marketable, contain more than 20 percent of breading materials.)

The Federal District Court in its 1963 opinion held that the Labor Department's interpretation as applied in this case was invalid. The District Court denied the injunction and said that the section 13(b) (4) exemption in the Fair Labor Standards Act "plainly encompasses the processing of living organisms which are taken from the sea. And so long as the processes involved are directed primarily at those sea organisms (though nonaquatic matter may be incidentally added), the processes should be within the statutory exemption." The court said that the percentage of nonaquatic ingredients should be only one relevant factor to be considered.

The District Court's opinion went on to say that it is relevant whether the products retain a consistent identity from the time they arrive at the plant until they are packaged for market. In this case, the court said, "the oysters arrive as oysters and leave as oysters regardless of the addition of nonaquatic

material." The same principle was held to be applicable to the other products processed by the packer, although the court noted that it was a closer question with respect to the crab cakes and deviled crabs which undergo more extensive preparation and change of form.

A second reason cited by the District Court for invalidating the Labor Department's regulation as applied to those products was that the regulation did not carry out the Congressional intent which "was to make allowances for an industry which is seasonal in nature and which deals with highly perishable commodities, thus demanding long hours as unpredictable as the run of the fish and offering no work for long slack periods; and therefore manifestly not suited to the conventional 8-hour day and 40 hour-week."

The opinion of the District Court was appealed, and on August 19, 1964, the United States Court of Appeals for the Fourth Circuit in Richmond upheld the ruling of the District Court.

Before the Court of Appeals, the Labor Department took the position that even if the preparation of breaded products from perishable and fresh aquatic products was covered by the overtime exemption, the exemption should not be applicable when the breading and processing operation is carried out on prefrozen small shrimp and fish. Such processing did not, the Labor Department contended, fall within the Congressional intent to provide an exemption for processing of perishable commodities.

The Court of Appeals held that the statutory exemption of section 13(b) (4) was not phrased in such narrow terms as to apply solely to the processing of a raw fresh product. The court noted that the exemption applied not only to processing but also to storing, packing for shipment, and distributing frozen seafood. The court thus found no basis in the statute for a distinction between those employees who process and handle previously frozen fish and small shrimp and those other employees of the same employer who handle exclusively a much larger volume of previously unfrozen products of the sea.

It is not known whether the Department of Labor will seek to obtain Supreme Court review of the Court of Appeals decision upholding the District Court invalidation of the "20-percent nonaquatic matter rule."

Although the case involved only frozen products, the Labor Department's interpretative bulletin in issue is applicable alike to frozen and canned aquatic products.

Note: See Commercial Fisheries Review, September 1963 p. 110, March 1962 p. 62.

Eighty-Eighth Congress

(Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ADJOURNMENT OF 88th CONGRESS: The House on Oct. 2, 1964, and the Senate on Oct. 3, 1964, adopted H. Con. Res. 371, providing for sine die adjournment of the 2nd session of the 88th Congress on Oct. 3.

ASSEMBLING OF 89th CONGRESS: The House on Oct. 2, 1964, and the Senate on Oct. 3, 1964, adopted H.J. Res. 1192, providing for the convening of the 89th Congress on January 4, 1965.

ALASKA DISASTER RELIEF: On September 30, 1964, Senator Bartlett spoke in the Senate, reviewing the accomplishments thus far attained in Alaska since the earthquake disaster of last March. In his remarks he inserted portions of the reports from the Federal Reconstruction and Development Commission of Alaska and the Office of Emergency Planning (Congressional Record, pp. 22487-22495).

ALASKA EARTHQUAKE DAMAGE: On September 16, 1964, Congressman Rivers spoke in the House and inserted in the Appendix of that day's Congressional Record (pp. A4709-A4711), the text of a speech by Alaska's Governor to the convention of the Alaska Association of Realtors at Anchorage on September 10, 1964. The speech outlined accomplishments thus far attained in Alaska to overcome the earthquake disaster of March 1964.

ALASKA SALMON: Senator Bartlett on September 29, 1964, spoke in the Senate and inserted in that day's Congressional Record (pp. 22304-22305) an article by the Director of the Fisheries Research Institute of the University of Washington College of Fisheries which

appeared in the September 1964 issue of the Pacific Fisherman. The article titled "Prospects for Alaska Salmon: Let Me Be an Optimist" discusses salmon resources, most of the salmon problems, and what can be done in view of the future.

COMMERCIAL FISHERIES RESOURCES SURVEY: S. Rept. 1469, Survey of Marine and Fresh-Water Commercial Fisheries (August 18, 1964, report from the Committee on Commerce, United States Senate, 88th Congress, 2nd Session, to accompany S.J. Res. 174), 17 pp., printed. The Committee recommended passage (with amendments) of S.J. Res. 174, to authorize and direct the Bureau of Commercial Fisheries to conduct a survey of the marine and fresh-water commercial fishery resources of the United States, its territories, and possessions. The bill would obtain, through a comprehensive survey by the Bureau of Commercial Fisheries, information and data on marine and fresh-water resources, existing and potential, which will enable the commercial fishery industries of the United States to meet the need for their distinctive protein-rich food products, for byproducts required by expanding industrial uses, and, in the event of national emergency, for such vessels and manpower as may be necessary or useful to our maritime defense. Such a survey also is needed so the Congress may legislate properly and wisely on matters pertaining to the development, utilization, and conservation of these valuable resources, many of which presently are threatened with serious depletion. Contains the purpose, historical background, and an analysis of the resolution; also agency comments.

FISHING INDUSTRY PROBLEMS: On September 24, 1964, Senator Bartlett spoke in the Senate and inserted in that day's Congressional Record (pp. 22092-22093) an address by the director of the fishery products program, National Canners Association, delivered at the 23rd Annual Meeting of the Atlantic States Marine Fisheries Commission. The address discussed the problems facing the American fishing industry.

FISHERY LEGISLATION: On October 2, 1964, Senator Bartlett spoke in the Senate inserting in that day's Congressional Record (p. 22748) a speech delivered at the Atlantic States Marine Fisheries Commission on September 22 by H. E. Crowther, Deputy Director, Bureau of Commercial Fisheries. The speech was titled "Significant Fishery Legislation of the 88th Congress."

FOOD-FOR-PEACE, AND FISH: On September 14, 1964, Senate resumed consideration of H.R. 11380, to amend further the Foreign Assistance Act of 1961, as amended, and for other purposes. Senate on September 17, 1964, debated H.R. 11380. On September 24, 1964, Senate passed, with amendments, H.R. 11380. Senate insisted on its amendments, asked for a conference with House, and appointed conferees. Authorizes appropriations of $50 million for purchase of domestically-produced beef, poultry, and other meats, and meat products, dairy products, rice, and other high-protein foods which are in adequate supply in the United States for donation to school lunch and similar programs in foreign countries eligible for assistance under the bill. Senator McGovern stated that "other high protein foods" would include fish and fish products.

On September 28, 1964, the Senate received the President's communication transmitting supplemental material to be included with the 20th semiannual report on activities carried on under P.L. 480, 83rd Congress, outlining operations under the Act for the period of January 1-June 30, 1964. Referred to the Senate Committee on Agriculture and Forestry.

On September 30, 1964, objection was made in the House to a unanimous-consent request to send to conference H.R. 11380, fiscal year 1965 authorizations for the foreign aid program. The Committee on Rules reported (Rept. 1922) H.Res. 895, providing for sending to conference H.R. 11380.

On October 1, 1964, the House by a voice vote adopted H.Res. 895, providing for sending to conference H.R. 11380, fiscal 1965 authorizations for the foreign aid program. On same day the conference report (Rept. 1925) was filed. H.R. 11380 was signed by the President October 7, 1964 (P.L. 88-633). As approved, the bill does not include the Senate amendment authorizing an additional appropriation of $50,000,000 to be used to donate domestically-produced meat and other protein foods to school lunch programs abroad.

On September 16-17, 1964, the Senate and House met in executive session to resolve the differences between the Senate- and House-passed versions of S. 2687, extending for 2 years the Agricultural Trade Development and Assistance Act of 1954 (P.L. 480) but did not reach a final agreement.

On September 22, 1964, conferees filed a conference report (H. Rept. 1897) on S. 2687.

H. Rept. 1897, Public Law 480 Extension (September 22, 1964, report from the Committee on Conference, House of Representatives, 88th Congress, 2nd Session, to accompany S. 2687), 8 pp., printed. Contains Committee recommendations on an amendment to S. 2687, to extend the Agricultural Trade Development and Assistance Act of 1954, as amended, and for other purposes; also a statement of managers on the part of the House. The Conference Report extended the Authorization for Titles I and II of the Act (P.L. 480) for a 2-year period, and approved an authorization of $2.7 billion plus carryover of unused funds from past years, for Title I activities for the 2-year period. The House-passed version of the bill had authorized a 3-year extension for Titles I and II, with an authorization of $4 billion plus carryover for Title I programs for the 3-year period. Fishery products are included under Title I.

On Sept. 23, 1964, the House adopted the conference report on S. 2687, and sent the legislation to the Senate. The Senate debated the conference report and agreed to vote on September 24, 1964, on a motion to refer the conference report to the Committee on Foreign Relations for hearings and study. Senate on September 24, 1964, adopted conference report on S. 2687, clearing bill for the President's signature. On October 8, 1964, S. 2687 was signed by the President (P.L. 88-638).

On October 3, 1964, Senator McGovern spoke in the Senate stating that Peace Director Richard W. Reuter told the American Soybean Association recently that "food for peace is coming closer to a moment of truth" when we must decide if we are going to produce foodstuffs for foreign assistance programs or terminate the programs because our surpluses have been liquidated. The address ("Public Law 480: Surplus Disposal Is Not Enough") was ordered printed in the "Congressional Record" of October 15, 1964 (pp. A5330-5331).

HEALTH, EDUCATION, AND WELFARE APPROPRIATIONS, FY 1965: On September 3, 1964, House agreed to conference report, and on same day Senate

adopted conference report (H. Rept. 1880), and concurred in House amendments to Senate amendments on H.R. 10809, fiscal year 1965 appropriations for the Departments of Labor and Health, Education, and Welfare, and related agencies. Bill was cleared for the President's signature. H.R. 10809 signed by President on September 19, 1964 (P.L. 88-605). Under Department of Health, Education, and Welfare provides funds for water supply and pollution control; for special investigation of water pollution in lower Mississippi where large fish kills have occurred; the Public Health Service's two new laboratories for shellfish sanitation measures; shellfish sanitation and certification; the Food and Drug Administration's botulism research.

NATURAL RESOURCES DEPARTMENT: On October 2, 1964, Senator Morse spoke in the Senate proposing that all Federal programs primarily intended for the management of the Nation's natural resources be brought together in a single Department of Natural Resources.

NORTH PACIFIC FISHERIES CONVENTION: It was announced on September 14, 1964, that the President pro tempore appointed Senators Bartlett and Fong to attend the third round in a series of talks between Canada, Japan, and the United States on the International Convention for the High Seas Fisheries of the North Pacific Ocean, which opened in Ottawa, September 9, 1964.

PASSAMAQUODDY TIDAL POWER PROJECT: Passamaquoddy-St. John (Hearing before a Subcommittee of the Committee on Public Works, United States Senate, 88th Congress, 2nd Session, on S. 2573), 136 pp., printed Contains hearing held August 12, 1964, on S. 2573, to authorize the International Passamaquoddy Tidal Power Project, including Hydroelectric Power Development of the Upper St. John River, and for other purposes. The project envisions the use of the power potential of the tides of Passamaquoddy Bay and the flows of the Saint John River in the State of Maine and the Province of New Brunswick for promoting economic development and providing flood control. Hearing was limited to consideration of the technical studies completed by the Department of the Interior and the U. S. Corps of Engineers. The presiding Senator pointed out that in the next Congress, it is planned to expand the hearings for comments by other Government departments and to hear public witnesses. Contains statements from the Secretary of the Interior and Secretary of the Army; the text of the bill; the supplemental report of the Passamaquoddy-Saint John River Study Committee to the Secretary of the Interior, dated August 3, 1964, together with introductory remarks of the Department of the Interior.

PESTICIDES: On September 14, 1964, Congressman Cunningham spoke in the House and inserted in the Appendix of that day's Congressional Record (pp. A4687-A4688) an article from the July issue of the publication Farm Chemicals entitled "Pesticides and Scare Campaigns." The article traces the various campaigns against pesticides dating back to 1900.

RADIATON PRESERVATION OF FISH: On September 22, 1964, Senator Mundt spoke in the Senate and inserted in that day's Congressional Record (pp. 21787-21791) an address by the director of the Donner Laboratory and Donner Pavilion at the University of California, entitled "Atomic Energy, Science, and Education." In the address it was mentioned that one of the current Atomic Energy Commission studies is concerned with the radiation preservation of fish.

Senator Saltonstall on September 28, 1964, spoke in the Senate and inserted in that day's Congressional Record (p. 2257) an article entitled "Eerie Blue Lights--A Revolution in Seafoods" from the Boston Globe, which commented on the dedication of the Atomic Energy Commission's new experimental laboratory for the radiation of marine products in Gloucester, Mass. The laboratory is to experiment with the preservation of fish and shellfish products.

SALMON CANNING: On September 28, 1964, Senator Bartlett spoke in the Senate concerning salmon canning and inserted in that day's Congressional Record (pp. 22250-22252) an article from the September 1964 Pacific Fisherman titled "One Hundred Years of Growth in Salmon Canning."

SUPPLEMENTAL APPROPRIATIONS, FY 1965: Supplemental Appropriation Bill, 1965 (Hearings before Subcommittee of the Committee on Appropriations, House of Representatives, 88th Congress, 2nd Session). Part 1, 506 pp., printed; Part 2, 181 pp., printed. Contains hearings held August 10-17, 1964, on supplemental appropriations for fiscal year ending June 30, 1965, and for other purposes for various agencies. Includes testimony, statements, communications, and reports from various Federal agencies and their officials and Congressmen. Under the Interior Department are included supplemental funds for the Fish and Wildlife Service's two Bureaus--Commercial Fisheries, and Sport Fisheries and Wildlife. For the Bureau of Commercial Fisheries an increase of $25,000 in order to meet the increased administrative expenses for loan program activity due to the Alaska earthquake and tidal wave in March 1964. Enactment of Commercial Fisheries Research and Development Act of 1964 (P.L. 88-309) authorizes the Secretary to make loans from available funds to commercial fishermen for chartering vessels until June 30, 1966. This will provide immediate relief pending reconstruction of the Alaskan commercial fishing fleet. Presently available for administrative expenses of the Fisheries Loan Fund in 1965 is $302,000, an increase of $25,000. Contains statements, budget summaries, and estimates. Also, for the Bureau of Sport Fisheries and Wildlife an increase of $1,050,000 (presently available for 1965 is $33,810,000), $900,000 of which is for the administration of wildlife resources activity, and $150,000 is for pesticide research activity (to review referrals from the Department of Agriculture of applications for label registration of chemicals under the Federal Insecticide, Fungicide and Rodenticide Act; review will determine the actual or potential hazards to fish and wildlife from the proposed use of a chemical; and to assist and advise the Food and Drug Administration in establishing tolerances).

The Supplemental Appropriations Bill, 1965 (Hearings before the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session on H.R. 12633), 822 pp., printed. Contains hearings held August 14, 1964-September 24, 1964, on H.R. 12633, an act making appropriations for the fiscal year ending June 30, 1965, and for other purposes. Includes text of the bill, testimony, statements, communications, and reports from various Federal agencies and their officials, as well as Representatives and Senators, and State and other officials. Under the Department of the Interior there are additional funds for the two Bureaus of the U. S. Fish and Wildlife Service. For the Bureau of Commercial Fisheries there is an increase of $25,000 in the limitation of $277,000 for fiscal year 1965 on administrative expenses for the fisheries vessel loan fund. The additional amount is needed because of the additional

loan workload raised by the March 1964 earthquake and tidal wave. In addition, included was a request for $3 million for a fishing vessel construction differential subsidy program. For the Bureau of Sport Fisheries and Wildlife there is a supplemental appropriation of $1,050,000 of which $900,000 is to replace a permanent appropriation. Also $700,000 in construction funds for rehabilitation of facilities which have been damaged by floods.

On September 17, 1964, H.R. 12633 was reported to the House (H. Rept. 1891).

H. Rept. 1891, Supplemental Appropriation Bill, 1965 (September 17, 1964, report from the Committee on Appropriations, House of Representatives, 88th Congress, 2nd Session, to accompany H.R. 12633), 33 pp., printed. To make supplemental appropriations for fiscal year 1965 for various departments and agencies.

On September 22, 1964, House passed H.R. 12633 by a record vote of 208 yeas to 103 nays.

The Senate Committee on Appropriations on September 22, 1964, held hearings on H.R. 12633. It received testimony from the Deputy Director of the U. S. Bureau of Commercial Fisheries on funds for the fishing vessel construction subsidy program under P.L. 88-498. On September 24, 1964, Senate Committee on Appropriations concluded its hearings on H.R. 12633.

On September 29, 1964, the Senate Committee on Appropriations reported (S. Rept. 1604), with amendments, H.R. 12633.

SUPPLEMENTAL APPROPRIATIONS, FY 1965: S. Rept. 1604, Supplemental Appropriation Bill, 1965 (September 29, 1964, report from the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session, to accompany H.R. 12633), 47 pp., printed. The committee recommended supplemental appropriations for the fiscal year ending June 30, 1965, and for other purposes. Bill was reported to the Senate with amendments. Contains the Committee's recommendations for supplemental fund for various Federal agencies. Under the Department of the Interior there are additional funds for the two Bureaus of the U. S. Fish and Wildlife Service: Commercial Fisheries and Sport Fisheries and Wildlife.

On October 1, 1964, the Senate passed H.R. 12633, making supplemental appropriations for fiscal year 1965. The Senate insisted on its amendments, asked for a conference with the House, and appointed conferees. The House agreed to the conference and appointed conferees. On October 2, 1964, the Conference Report (H. Rept. 1928) on H.R. 12633 was filed and it was adopted by the House and Senate.

SUPPLEMENTAL APPROPRIATIONS, FY 1965: H. Rept. 1928, Supplemental Appropriation Bill, 1965 (October 2, 1964, report from the Committee of Conference House of Representatives, 88th Congress, 2nd Session, to accompany H.R. 12633), 10 pp., printed. The Committee recommended that the Senate recede from certain of its amendments and that the House recede from its disagreements to certain amendments of the Senate, and agreed to the same.

The Senate cleared the bill for the President on October 3, 1964, by concurring in House amendment (as modified by House action on same day when it receded and concurred with an amendment) to a Senate amendment.

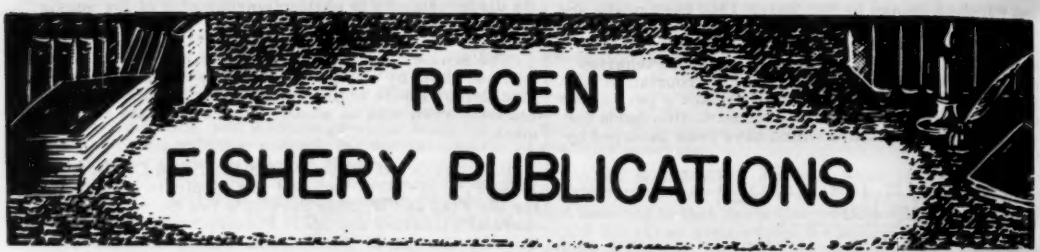
H.R. 12633 was signed by the President October 7, 1964 (P.L. 88-635). Included are supplemental funds for the Fish and Wildlife Service's two Bureaus--Commercial Fisheries and Sport Fisheries and Wildlife. For the Bureau of Commercial Fisheries there is $25,000 for increased administrative expenses for vessel loan program activity due to the Alaska earthquake and tidal wave in March 1964; and $2,500,000 for the fishing vessel construction subsidy program under P.L. 88-498.

TRADE AGREEMENTS PROGRAM: The Senate and House on September 23, 1964, received a message (H. Doc. 366) from the President transmitting the eighth annual report on the operation of the Trade Agreement Program. Referred to the Senate Committee on Finance and the House Committee on Ways and Means.

TERRITORIAL WATERS OF THE UNITED STATES: On October 1, 1964, Congressman Pelly spoke in the House concerning the need for the United States to extend its fishing limits to 12 miles.

WATER POLLUTION CONTROL ADMINISTRATION: H. Rept. 1885, Federal Water Pollution Control Act Amendments (September 4, 1964, report from the Committee on Public Works, House of Representatives, 88th Congress, 2nd Session, to accompany S. 649), 29 pp., printed. The Committee recommended passage (with amendments) of S. 649, to amend the Federal Water Pollution Control Act, as amended, to establish the Federal Water Pollution Control Administration, to provide grants for research and development, to increase grants for construction of municipal sewage treatment works, to authorize the issuance of regulations to aid in preventing, controlling, and abating pollution of interstate waters, and for other purposes. Contains the purpose, general statement, and major provisions of the bill; views of the Committee; changes in existing law; text of the bill; minority views; and supplemental views of Representatives Clausen and James.

WATER RESOURCES COUNCIL: H. Rept. 1877, Water Resources Planning Act (September 2, 1964, report from the Committee on Interior and Insular Affairs, House of Representatives, 88th Congress, 2nd Session, to accompany S. 1111), 34 pp., printed. The Committee recommended passage to provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water resources council and river basin commission, and by providing financial assistance to the States in order to increase State participation in such planning. Contains the text, purpose, need, section-by-section analysis, and cost of the bill. Also, includes communications from various departments regarding the bill.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number — Title

CFS-3540 - Frozen Fishery Products, June 1964, 8 pp.
CFS-3551 - Massachusetts Landings, January 1964, 6 pp.
CFS-3552 - Louisiana Landings, 1963 Annual Summary, 8 pp.
CFS-3553 - Shrimp Landings, January 1964, 5 pp.
CFS-3555 - Shrimp Landings, February 1964, 5 pp.
CFS-3557 - New York Landings, May 1964, 5 pp.
CFS-3567 - Virginia Landings, April 1964, 4 pp.
CFS-3568 - California Landings, May 1964, 4 pp.
CFS-3572 - Rhode Island Landings, March 1964, 3 pp.
CFS-3573 - Fish Meal and Oil, June 1964, 2 pp.
CFS-3574 - Middle Atlantic Fisheries, 1963 Annual Summary, 6 pp.
CFS-3576 - New Jersey Landings, June 1964, 3 pp.

SL-16 - Wholesale Dealers in Fishery Products, Florida, 1963, 16 pp. (revised).

Sep. No. 710 - Comparison of Salmon Catches in Monofilament and Multifilament Gill Nets--Part II.

Sep. No. 711 - Weights and Measures Activities in the USDI Fishery Products Standards and Inspection Programs.

FL-336 - Commercial Fisheries Outlook, April-June 1964, 4 pp.

FL-567 - Caviar and Other Fish Roe Products, by Norman D. Jarvis, 10 pp., May 1964. Covers the steps involved in processing grain caviar in barrels; salted and smoked cod roe; dry-salted, and air-dried and pressed mullet roe; salmon caviar; salted and air-dried tuna roe; and tuna caviar.

SSR-Fish. No. 464 - Fish Schools and Bird Flocks in the Central Pacific Ocean, by Kenneth D. Waldron, 25 pp., illus., March 1964.

SSR-Fish. No. 476 - Herring Fishery of the U. S. Passamaquoddy Region, by Leslie W. Scattergood and Lewis J. Lozier, 25 pp., illus., March 1964.

SSR-Fish. No. 481 - Air and Water Temperatures and Stream Flow Data, Convict Creek, Mono County, California, 1950 to 1962, by Harry D. Kennedy, 50 pp., April 1964.

Extent of Acid Mine Pollution in the United States Affecting Fish and Wildlife, by Edward C. Kinney, Circular 191, 32 pp., illus., processed, June 1964.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number — Title

MNL-11 - Fishing Industry in Spain, 1963, 8 pp.
MNL-26 - Taiwan Fisheries in 1963, 21 pp.,
MNL-40 - Moroccan Fishing Industry, 1962/63, 19 pp.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary--Fishery Products, January, February, March, and April, 1964, 8 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 103 S. Gay St., Baltimore, Md. 21202.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous periods; and wholesale prices for fresh fishery products on the Baltimore market; for the months indicated.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, July 1964, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

Fishery and Oceanography Translations, no. 1, June 1964, 41 pp., processed. (Branch of Reports, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.) The first of a new series established to provide information about translations of fishery and oceanography literature. Future issues of this periodical will include translated Russian current titles, journal tables of contents, and short translations. In July 1963 the Bureau of Commercial Fisheries, Branch of Reports, established a Translation Program to disseminate information about Russian scientific literature, to

produce Russian translations for scientists, and to act as a clearinghouse for information on translations from all languages. The Translation Program maintains a bibliographic file begun in 1959 and containing records of nearly 5,000 completed translations and more than 300 translations in progress. In addition, approximately 1,200 translations are available on interlibrary loan. This issue contains an article, "Russian serials of interest to aquatic biologists, fishery technologists, and oceanographers," by Kristian Fr. Wiborg and Paul T. Macy; and a list, "Translations of fishery and oceanography literature, authors A-F," compiled by Paul T. Macy.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, July 1964, 4 pp. (Market News Service, U.S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, July 1964, 22 pp. (Market News Service, U.S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

North Pacific Oceanography, February-March 1963, by W. James Ingraham, Jr., Data Report No. 3, 1 microfiche card, October 24, 1963. (Branch of Reports, Bureau of Commercial Fisheries, U.S. Department of the Interior, Washington, D. C. 20240.)

Oceanographic Observations, 1961, East Coast of the United States, by Joseph Chase, Data Report No. 1, 6 microfiche cards, illus., September 25, 1963, distribution limited. (Branch of Reports, Bureau of Commercial Fisheries, U.S. Department of the Interior, Washington, D. C. 20240.) This is the first in the new Data Report Series, which comprises reports that include compilations of unanalyzed data collected during oceanographic, limnological, or biological investigations. Each report will be serially numbered, issued separately, and paged separately. The reports will be distributed on 3- by 5-inch microfiche cards. Hard (full-size) copy will be available for purchase; however, the microfiches will be free to a restricted mailing list of laboratories, libraries, state fishery agencies, research institutions, and research scientists. Reports in this new series can be issued more quickly and cheaply and will occupy less storage space than the Special Scientific Reports--Fisheries in which such data were previously published.

Preliminary Results of the Systematic Screening of 4,306 Compounds as "Red-Tide" Toxicants, by Kenneth T. Marvin and Raphael R. Proctor, Jr., Data Report No. 2, 3 microfiche cards, February 10, 1964. (Branch of Reports, Bureau of Commercial Fisheries, U.S. Department of the Interior, Washington, D. C. 20240.)

Production of Fishery Products in Selected Areas of Maryland, Virginia, and North Carolina, 1963, by William N. Kelly, 33 pp., June 1964. (Market News Service, U.S. Fish and Wildlife Service, P.O. Box 447, Hampton, Va. 23369.) A summary of commercial landings of fish and shellfish and the production of crab meat and shucked oysters as reported by producers and wholesalers from selected principal fishing localities of Virginia, Maryland, and North Carolina. Discusses landings in the Hampton Roads, Lower Northern Neck, Lower Eastern Shore, and Chincoteague areas of Virginia; Ocean City, Cambridge, and Crisfield, Maryland; and Morehead City, North Carolina. Also covers landings by major species of finfish--scup, alewife, sea bass, tuna, fluke, gray sea trout, striped bass, croaker, butterfish, spot, shad, swordfish, and menhaden. Includes statistical tables on catches of the major finfish species, shrimp, and other shellfish; and landings by localities. Swordfish was landed in the area for the first time, with 14 long-line vessels participating in this fishery.

Receipts and Prices of Fresh and Frozen Fishery Products at Chicago, 1963, by C. E. Cope, 58 pp., illus., September 1964. (Fishery Market News Service, U.S. Fish and Wildlife Service, Rm. 704, 610 S. Canal St., Chicago, Ill. 60607.) Summarizes fishery products receipts and prices at Chicago during 1963. Notable events were the establishment of shrimp futures trading on the Chicago Mercantile Exchange; initiation of air shipments of Alaskan fresh-water fish to Chicago; and the perfecting of a yellow perch filleting machine. Statistical tables include data on receipts of fish and shellfish at Chicago wholesale market by species, states, and provinces, and by months; and wholesale market price ranges by months for fresh-water fish, frozen fillets, and other frozen fish and shellfish.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, August 1964, 9 pp. (Market News Service, U.S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle 4, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels as reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Sea-Water Systems for Experimental Aquariums, edited by John R. Clark and Roberta L. Clark, Re-

search Report 63, 192 pp., printed, 1964, $1.25. Includes 27 papers dealing with different sea-water systems in a number of Federal, state, and foreign marine laboratories. Should be of value to all who are concerned with fresh-water as well as sea-water aquarium systems.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ACCLIMATIZATION:

"Akklimatiizatsiya ryb vo vnutrennik vodoemakh Latviiskoi SSSR" (Acclimatization of fishes in the inland waters of the Latvian SSSR), by G. P. Andrushaitis, article, Akklimatizatsia Zhivotnykh v SSSR, pp. 212-213, printed in Russian, 1963. Akademiia Nauk Kazakhskoi SSSR, Alma-Ata, U.S.S.R.

"Biologicheskoe obosnovanie i perspektivy akklimatizatsii vesennenerestuyushchego siga v vazhneishikh vodokhranilishchakh SSSR" (Biological basis and prospects for the acclimatization of spring-spawning whitefish in the more important reservoirs of the USSR), by V. I. Anpilova, article, Akklimatizatsia Zhivotnykh v SSSR, pp. 214-216, printed in Russian, 1963. Akademiia Nauk Kazakhskoi SSSR, Alma-Ata, U.S.S.R.

ALGAE:

"Alginic acid," by Louis Lefur, article, Chemical Abstracts, vol. 58, March 18, 1963, 5458a, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Developing an unconventional food--algae--by continuous culture under high light intensity," by Robert O. Matthern and Robert B. Koch, article, Food Technology, vol. 18, May 1964, pp. 59-65, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

AMINO ACIDS:

"Amino acid composition of defatted fish flour from oil sardine (Clupea longiceps)," by S. B. Kadkol and N. L. Lahiri, article, Chemical Abstracts, vol. 58, February 4, 1963, 2781a, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Seasonal influence on the free amino acids in fish muscle and their importance for quality," by F. Bramstedt, article, Zeitschrift fur Ernahrungswissenschaft, supplement 3, 1963, p. 51, printed in German. Journal of Nutritional Science, Holzhofallee 35, Darmstadt, Germany.

ANCHOVY:

"The food and feeding habits of the anchoveta, Cetengraulis mysticetus," in the Gulf of Panama, by William H. Bayliff, article, Inter-American Tropical Tuna Commission Bulletin, vol. 7, no. 6, 1963, pp. 456-459, printed in Spanish and English. Inter-American Tropical Tuna Commission, La Jolla, Calif.

"Nekotorye sravnitel'nye dannye o razmnozhenii anchousa Engraulis encrasicholus L." (Some comparative data on the reproduction of the anchovy Engraulis encrasicholus L.), by T. V. Dekhnik, article, Voprosy Ikhtiologii, vol. 3, no. 1, 1963, pp. 144-151, illus., printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

ANIMAL NUTRITION:

"Microbiological evaluation of protein quality with Tetrahymena pyriforms W. I--Characteristics of growth of the organisms and determination of relative nutritive values of intact proteins," by W. R. Fernell and G. D. Rosen, article, British Journal of Nutrition, vol. 10, 1956, pp. 143-155, illus., printed. Cambridge University Press, 32 E. 57th St., New York, N. Y. 10022.

ANTIBIOTICS:

"Test on the storage of white fish in ice with added aureomycin," by F. Soudan, J. R. Crepey, and M. Dubost, article, Revue des Travaux, Institut Scientifique et Technique des Pêches Maritimes, vol. 27, no. 2, June 1963, pp. 211-220, illus., printed in French. Institut Scientifique et Technique des Pêches Maritimes, 59 Ave. Raymond Poincaré, Paris XVI, France.

ARGENTINA:

"Numerosas adhesiones recibe el Primer Congreso de Promocion Pesquera Bonaerense a Realizarse en el mes de Mayo en la ciudad de Mar del Plata" (Many participants admitted to the First Congress for the Promotion of Fisheries in Buenos Aires Province, to take place in the month of May in the city of Mar del Plata), article, Asuntos Agrarios, vol. 11, no. 128, April 1964, p. 3, printed in Spanish. Departamento de Publicaciones, Avda. 51, No. 774, La Plata, Argentina.

"Piscicultura del pejerrey--Dependencias de la Estacion Hidrobiologica de Chascomus" (Pond culture of the pejerrey--Branch of the Hydrobiological Station at Chascomus), by Fernando C. Ramirez and Haydee A. Macioci, article, Asuntos Agrarios, vol. 11, no. 129, May 1964, p. 5, illus., printed in Spanish. Departamento de Publicaciones, Avda. 51, No. 774, La Plata, Argentina.

"Piscicultura del pejerrey. IV--Expedicion y siembra de alevinos" (Pond culture of the pejerrey. IV--Field trip and planting of fingerlings), by Fernando C. Ramirez and Haydee A. Macioci, article, Asuntos Agrarios, vol. 11, no. 128, April 1964, p. 5, illus., printed in Spanish. Departamento de Publicaciones, Avda. 51, No. 774, La Plata, Argentina.

"El Primer Congreso de Promocion Pesquera Bonaerense establecio las bases para el mejor aprovechamiento de nuestra riqueza icticola" (The First Congress for the Promotion of Fisheries in Buenos Aires Province established the necessary bases for the better development of our ichthiological riches), article, Asuntos Agrarios, vol. 11, no. 129, May 1964, pp. 1, 8-10, illus., printed in Spanish. Departamento de Publicaciones, Avda. 51, No. 774, La Plata, Argentina.

BELGIUM:

Officiele Lijst der Belgische Vissersvaartuigen, 1964 (Official List of Belgian Fishing Vessels, 1964), 75 pp., printed in Flemish, 1964. Ministerie van Verkeersweezn, en van Post, Telegraaf en Telfoon, Brussels, Belgium.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

BUFFALOFISH:

Wholesale Market Demand for Buffalofish, by Marsha A. Walters, 72 pp., processed, September 1961. University of Arkansas, College of Business Administration, Industrial Research and Extension Center, Fayetteville, Ark.

BYPRODUCTS:

"Fish for meal and oil. Part 2--South Africa," by J. A. Lovern, article, News Summary, no. 14, May 1964, pp. 14-16, processed in English with French, German, and Spanish summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England. The main fish species used for meal and oil manufacture in South Africa are the pilchard (Sardinops ocellata) and the maasbanker or horse mackerel (Trachurus trachurus). The oil content shows a similar range, with commercial yields ranging from about 3 gallons to over 20 gallons per short ton, with an average of about 11. Pilchard oil is more unsaturated than maasbanker oil, the respective iodine values being 172-203 and 142-164.

CANADA:

Fisheries Statistics, Nova Scotia, 1962, 46 pp., illus., printed in French and English, July 1964, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada. Consists of tables showing quantity and value of landings in Nova Scotia during 1950-1962 by species; value of fishery products, 1950-1962; classification of fishing vessels in Nova Scotia by weight, length, fisheries districts, and type of gear used, 1961/1962; new capital investment in the Nova Scotian fishery, 1962; number of fishermen and persons engaged in the major fisheries, 1961/1962.

CARP:

"Fish eat weeds to aid power plant operation," article, Science News Letter, vol. 86, no. 9, August 29, 1964, p. 139, printed, single copy 15 cents. Science Service, 1719 N St. NW., Washington, D. C. 20036.

CHARTS:

U.S. Lake Survey Catalog of Charts of the Great Lakes and Outflow Rivers (also Lake Champlain, New York State Barge Canal System, Minnesota-Ontario Border Lakes), Edition of 1964/1965, 25 pp., illus., printed, 1964. Technical Publications Branch, U. S. Army Engineer District, Lake Survey, Corps of Engineers, 630 Federal Bldg., Detroit 26, Mich. Charts listed in this catalog were prepared by the U. S. Lake Survey, whose mission is the preparation and publication of navigation charts and pilots covering the Great Lakes, Lake Champlain, New York State Barge Canal System, and the Minnesota-Ontario Border Lakes; the study of matters affecting the hydrology of the Great Lakes, including the necessary hydrographic and related surveys; and research pertinent to the development and improved utilization of the water resources of the Great Lakes System. Included for each chart listing is information on locality, scale, size, and price.

COLD STORAGE:

"The effect of temperature on the spoilage rate of wet white fish," by R. Spencer and C. R. Baines, article, Food Technology, vol. 18, May 1964, pp. 175-179, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

"Nouveau procédé pour la conservation par le froid des crustaces a l'état frais" (A new process for the cold storage of fresh crustaceans), article, La Revue de la Conserve, vol. 18, no. 3, May-June 1963, p. 177, printed in French. Société d'Edition pour l'Alimentation, 1 Rue de la Réale, Paris 1, France.

"Vom trawler ins lagerhaus an der wasserstrasse" (From the trawler directly to the wharf cold store), article, Ties Kuhlkette, no. 91, July 1963, p. 16, printed in German. H. E. Albrecht Verslag KG., Freihamerstrasse No. 2, Munich, Germany.

COMPOSITION:

"Chemical composition of fish and fish products," by H. Houwing, article, Voeding, vol. 24, 1963, p. 170, printed. Netherlands Journal of Nutrition, Kominginengracht 42, The Hague, Netherlands.

"Trace elements in far-Eastern fish, crustaceans and mollusks," by K. M. Mershina, N. M. Khalina and A. I. Krasnitskaya, article, Chemical Abstracts, vol. 59, November 25, 1963, 13270f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Variations in the chemical composition of three freshwater fishes of Bhavanisagar reservoir," by A. Sreenivasan and M. V. Natarajan, article, Indian Journal of Fisheries, vol. 8, October 1961, pp. 436-439, printed. Ministry of Food and Agriculture of Government of India, New Delhi, India.

CONGO REPUBLIC:

Foreign Trade Regulations of the Republic of the Congo (Leopoldville), OBR 64-61, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses the Congo Republic's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. Also covers special customs provisions, nontariff import controls, and Government representation between the Congo and the United States.

CONTAINERS:

Examen del Cierre de la Lata (Investigation of Can Seams), by Jose J. Franco Betancourt, Boletin de Divulgacion Tecnica, No. 1, 15 pp., illus., printed in Spanish with English abstract, October 1963. Centro de Investigaciones Pesqueras del Instituto Nacional de la Pesca, Playa Habana, Bauta, Cuba.

"Foam-lined cans for freeze-dried foods," article, Modern Packaging, vol. 36, January 1963, p. 70, printed. Diesel Publications Inc., 575 Madison Ave., New York 22, N. Y.

CRABS:

"Chemical control of the green crab, Carcinus maenas (L.)," by Robert W. Hanks, article, Proceedings of the National Shellfisheries Association, 1961, vol. 52, pp. 75-86, printed, 1963. National Shellfisheries Association, Virginia Institute of Marine Science, Gloucester Point, Va.

Crabs of Texas, by Sandra Pounds Leary, Bulletin No. 43, Series 7, Coastal Fisheries, 57 pp., illus., print-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ed, revised 1964. Texas Parks and Wildlife Department, John H. Reagan State Office Bldg., Austin, Tex. Designed to aid the occasional visitor to the Texas Coast in identifying at least the general group to which a particular crab may belong and to answer some of the many questions which arise concerning those crustacea. Bulletin devoted primarily to the commercial blue crab and the stone crab.

"King crab tagging methods in Alaska," by Murray L. Hayes, article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 262-265, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S., Canada.

"Nutritive value of crab meat," article, Food Manufacture, vol. 39, April 1964, p. 60, printed. Leonard Hill, Ltd., Stratford House, 9 Eden St., London NW1, England.

"Progress on blue crab research in the South Atlantic," by George H. Rees, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 100-115, printed, April 1963. Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

"O sostoyanii zapasov Kamchatskogo kraba u zapadnogo poberezh'ya Kamchatki" (Condition of king crab--Paralithodes camtschatica--stocks on the western coast of Kamchatka), by M. M. Lavrent'ev, article, Rybnoe Khoziaistvo, vol. 39, no. 2, 1963, pp. 19-25, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

CRAYFISH:
Habitat of Crayfish in Poland (Rozsiedlenie Rakow w Polsce), by Jozef Kossakowski, OTS 63-11397, 5 pp., illus., processed, 1964, 50 cents. (Translated from the Polish Gospodarka Rybna, no. 5, 1956, pp. 9-10.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

CUBA:
Cuban Center of Fishery Research, by R. Buesa, JPRS 24664, 8 pp., processed, May 19, 1964, 50 cents. (Translated from the Russian, Okeanologiya, vol. 4, no. 2, 1964.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

Las Pesquerias Cubanas (The Cuban Fisheries), by Rene J. Buesa, Contribution No. 20, 90 pp., illus., printed in Spanish with English abstract, February 1964. Centro de Investigaciones Pesqueras, Instituto Nacional de la Pesca, Playa Habana, Bauta, Cuba. Deals with the characteristics of Cuban fishery activities and developments, fishing grounds, fleet and gear, and number of fishermen. Establishes the yield rates for both cooperatives and government fishing organizations according to seasons, fishing gear, and fishing grounds. Also includes a list of marine species of major commercial value.

DECOMPOSITION:
"Significance of decomposition of adenosinetriphosphate in fish muscle at temperature around -2° C," by M. Bito and K. Amano, article, Bulletin of Tokai Regional Fisheries Research Laboratory, no. 32, 1962, pp. 149-153, illus., printed in Japanese with English summary. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

DOLPHIN:
"Sea intelligence: the dolphin," by Barbara Tufty, article, Science News Letter, vol. 86, no. 9, August 29, 1964, pp. 138-139, illus., printed, single copy 15 cents. Science Service, 1719 N St. NW., Washington, D. C. 20036. Describes the anatomy and "personality" of the dolphin, the history of man's interest in this mammal, and some of the research being conducted with it at the Communications Research Institute, Miami, Fla. The dolphin's intelligence and eagerness to learn may help in a first step towards man's communicating with animals and learning more about the sea.

ECUADOR:
"Apuntes e informaciones sobre las pesquerías en la Provincia de Manabí" (Memoranda and information on the fisheries in the Province of Manabí), article, Boletin Informativo, vol. 1, no. 2, 1964, pp. 1-66, illus., printed in Spanish, s/. 6.00 (US$0.35). Instituto Nacional de Pesca del Ecuador, Guayaquil, Ecuador. Discusses in detail the coastal fishery for shrimp, spiny lobster, and finfish; and the offshore tuna fishery.

EUROPEAN FISHERIES CONFERENCE:
Final Act of the European Fisheries Conference, London, Dec. 3, 1963 to March 2, 1964. With Fisheries Convention, Protocol of Provisional Application and Agreements as to Transitional Rights. London, March 9 to April 10, 1964, Miscellaneous No. 11 (Cmnd. 2355), printed, 1964, 2s. 7d. (50 U.S. cents). Sales Section, British Information Services, 845 3rd Ave., New York, N.Y. 10022.

FACTORYSHIP:
"Baza-przetwornia B 64 typu 'Pioniersk'" (Factory-mothership B 64 type "Pioniersk"), by Janusz Staszewski and Stanislaw Paszkowski, article, Budownictwo Okretowe, vol. 9, no. 6, June 1964, pp. 189-198, illus., printed in Polish with English summary. Wydawnictwa Czasopism Technicznych Not, Warsaw, Czackiego 3/5, Poland. On December 10, 1963, the factory-mothership Pioniersk, built by the Gdansk Shipyard for the Soviet fisheries, was commissioned. This article deals with the vessel's construction, its performance at sea, the part played by motherships in deep-sea fisheries, and accomplishments of those vessels. Topics covered include stability, hull construction, deck equipment, accommodation plan, fire fighting devices, holds, engineroom, electric equipment, repair shop, pipelines, freezing and processing plant, and delivery trials. Included are plans, diagrams, and photographs of the vessel.

FATTY ACIDS:
"Origin of the characteristic fatty acid composition of aquatic organisms," by Tibor Farkas and Sandor Herodek, article, Chemical abstracts, vol. 58, June 10, 1963, 12893g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Quantitative analysis of fatty acid esters of marine animal oils by gas-liquid chromatography," by Su-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ketaka Ito and Kazuo Fukuzumi, article, Chemical Abstracts, vol. 58, June 10, 1963, 12778e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

FISH FINDER:
"Telemetric estimation of set net catches by fish finder," by T. Koyama, article, Bulletin of Tokai Regional Fisheries Research Laboratory, no. 32, 1962, pp. 141-147, illus., printed in Japanese with English summary. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

FISH KILLS:
"So what did kill the fish?" by Warren Kornberg, article, Chemical Week, vol. 95, no. 4, July 25, 1964, pp. 19-26, illus., printed, single copy 50 cents. McGraw-Hill, Inc., 330 W. 42nd St., New York, N. Y. 10036. Reports on the Mississippi fish kill in the fall 1963, and congressional hearings on the subject.

FISH-LIVER OIL:
"Influence of various materials on the quality of cod-liver oil. I--Metals and synthetic materials," by H.J. Papenfuss, article, Fischereiforschung, vol. 4, 1961, pp. 25-67, printed in German. Institut fur Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, East Germany.

FISH MEAL:
"Assessment of protein quality in fish meal," by J. A. Lovern, article, News Summary, no. 14, May 1964, pp. 45-53, processed in English with French, German, and Spanish summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England. Discusses the structure of proteins, their digestion and utilization in the body, and chemical tests for protein quality.

"Quality of fish meals and their evaluation by chemical methods," by H. Dohler, article, Nutrition Abstracts and Reviews, vol. 34, 1964, p. 45, printed. Commonwealth Bureau of Animal Nutrition, Rowett Institute, Aberdeen, Scotland.

"Utilization of fish byproducts as cattle feed: influence of the method of manufacture on the digestibility and nutritive value of 'manthal' fish meal," by S. S. Negi and N. D. Kehar, article, Journal of Scientific and Industrial Research, vol. 21C, 1962, pp. 324-328, printed. Journal of Scientific and Industrial Research, Old Mill Rd., New Delhi 2, India.

FISH OIL:
"Composition of fatty acid mixtures of various fish oils," by E. Klenk and D. Eberhagen, article, Chemical Abstracts, vol. 57, November 26, 1962, 14303d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

FISH PASSAGE:
"Fish passage research in the Columbia River Basin," by Gerald B. Collins, article, Transactions of the Twenty-Eighth North American Wildlife and Natural Resources Conference, March 4, 5, and 6, 1963, pp. 356-360, printed, 1963. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

FISH PROTEIN CONCENTRATE:
"Changes in the vitamins B_1 and B_2 and PP content during the manufacture and storage of fish flour," by V. I. Treshcheva, article, Chemical Abstracts, vol. 59, July 22, 1963, 2104f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Enrichment of bread with fish flour for human consumption. 1--Study of baking and acceptability tests," by Gonzalo Donoso and others, News Summary, no. 14, May 1964, pp. 78-92, processed, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England. The purpose of the study covered in this report was to ascertain the highest percentage of enrichment of bread with fish flour for human consumption manufactured in Chile which would be acceptable to the consumer. Bread-making tests were carried out with dough enriched with 3, 6, 9, and 12 percent of fish flour (replacing corresponding quantities of wheat flour). The technological aspect of bread-making was considered, and subsequently the acceptability of the product through flavor tests with individual adults at various cultural levels and with children in primary schools. The report includes, besides a description of the tests, technical specifications for the preparation of the bread, remarks on the alteration of its quality with addition of fish flour, and standards for the classification of its organoleptic and general qualities.

FLOUNDER:
Catches of Flounder PLEURONECTES FLESUS L. in the Bornholm Deep in 1951-1955 (Stornia--Pleuronectes flesus L.--w Potowach w Rejonie Bornholmskin w Latach 1951-1955), by Zbigniew Reimann, OTS 61-11365, 26 pp., illus., processed, 1964, 50 cents. (Translated from the Polish, Prace Morskiego Instytutu Rybackiego w Gdyni, no. 10/A, 1959, pp. 441-459.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

FLYINGFISH:
The Flying Fishes (EXOCOETIDAE) of the Northwest Pacific, by N. Parin, OTS 61-31031, 84 pp., illus., printed, 1963. (Translated from the Russian, Akademiya Nauk SSSR, Trudy Instituta Okeanologii, vol. 31, 1960, pp. 205-285.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

FRANCE:
"L'evolution de la congelation dans la peche maritime (France)" (Evolution of freezing in sea-fishery), by A. Andre, article, Revue Pratique du froid, vol. 16, no. 211, October 1963, pp. 51-52, printed in French. Federation nationale des activites frigorifiques, 254 rue de Vaugirard, Paris XV, France.

FREEZE-DRYING:
"Azeotropic freeze-drying," by H. E. Wistreich and J. A. Blake, article, Science, vol. 138, no. 3537, 1962, p. 138, printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

Conference on Freeze-Drying of Foods, Chicago, 1961, edited by Frank R. Fisher, 246 pp., illus., printed, 1962. Quartermaster Research and Engineering Com-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

mand, U. S. Army Quartermaster Corps, Washington, D. C.

"Developments in freeze-drying 1963," article, Journal of Refrigeration, vol. 6, no. 3, May-June 1963, pp. 84-85, printed. Foxlow Publishers, Ltd., 19 Harcourt St., London W1, England.

"The freeze-drying of foodstuffs. Future trends," by K. Bird, article, Marketing Transport Situation, August 1963, pp. 26-32, illus., printed. Marketing Economics Division, U. S. Department of Agriculture, Washington, D. C. 20250.

"A practical guide for selection of freeze-drying equipment," article, Quick Frozen Foods, vol. 25, no. 12, July 1963, pp. 103-105, illus., printed. E. W. Williams Publications, Inc., 82 Wall St., New York, N. Y. 10005.

"Protein changes in freeze-dried muscle," by W. Partmann and G. Nemitz, article, Zeitschrift fur Lebensmittel-Untersuchung und - Forschung, vol. 120, no. 3, pp. 190-192, printed in German. Springer Verlag, 3 Heidelberger Platz, Wilmersdorf, Berlin, Germany.

"Taste tests rate freeze-dried foods," article, Information Bulletin, T.R.R.F., no. 63, August 1963, p. 1, printed. The Refrigeration Research Foundation, 12 N. Meade Ave., Colorado Springs, Colo.

FREEZING ON BOARD:

"Das frieren von fisch auf see mit 'Jackstone-Plattengefrierapparaten' vertikaler bauart" (Freezing of fish on board with the Jackstone vertical plate freezer), article, Kalte, vol. 16, no. 5, May 1963, pp. 214-216, illus., printed in German. Hans A. Keune Verlag, Pressehaus, 1 Speersort, Hamburg 1, Germany.

"Gefrieranlagen auf hochseetrawlern" (Freezing plants on board high-sea trawlers), by E. Strohrmann, article, Kalte, vol. 16, no. 5, May 1963, pp. 211-213, illus., printed in German. Hans A. Keune Verlag, Pressehaus, 1 Speersort, Hamburg 1, Germany.

Progress in the Development of Freezing on Board the British Distant-Water Trawler Fleet, by G. C. Eddie, Torry Memoir No. 140, 13 pp., printed in English with French summary. Torry Research Station, Aberdeen, Scotland.

FRESH-WATER FISH:

Our Freshwater Fishes, Educational Series, Picture Nos. 1, 2, 3, and 4, 1964, $1.50 a set. An educational series of four 6x9-inch plastic-coated cards showing 36 species of fresh-water fish in full-color photographs. In spite of the fact that color photographs are quite common today, there is still a lack of good color photographs of fish and other marine animals. The pictures shown on these cards show the color of living fish--something which is difficult to capture. Each card shows nine species of fish, and the back of the card has concise life history notes on each fish. The fish shown on the cards are: bluegill, smallmouth bass, black crappie, pumpkinseed, largemouth bass, green sunfish, northern longear sunfish, rock bass, warmouth, lake trout, sea lamprey, yellow perch, brown trout, brook trout, lake whitefish, rainbow trout, walleye or yellow pike, brown bullhead, black bullhead, and lake sturgeon. Also shown are: longnose gar, bowfin, carp, white sucker, river redhorse, white bass, channel catfish, freshwater drum, northern pike, golden shiner, muskellunge, grass pickerel, common shiner, tiger muskie, creek chub, and river chub. Teachers, educators, students, biologists, researchers, restaurants, and dealers will find these color photograph cards ideal for differentiating between and identifying the most common fresh-water fish species. Others interested in fisheries will find that the cards would lend themselves to framing. The author-photographer also has completed 11 fish pictures for the Society for Visual Education's 13x18-inch cards for schools; he is also able to supply transparencies of about 50 species of fresh-water fish.

--Joseph Pileggi

"Razmnozhenie osnovnykh promyslovykh rby v Cheremshanskom zalive Kuibyshevskogo vodokranilishcha v 1960 i 1961 gg." (Reproduction of the principal commercial fishes in the Cheremshan inlet of Kuibyshev Reservoir in 1960 and 1961), by V. M. Chikova, article, Materialy Pobiologii i Gidrologii Volzhskikh Vodochrnailishch, pp. 95-98, printed in Russian, 1963. Akademiia Nauk SSSR, Moscow, U.S.S.R.

FROZEN FISH:

"Zur frage des eniflusses postmortaler veränderungen auf die qualität von gefrierfisch" (Effect of postmortem changes on the quality of frozen fish), by W. Partmann and J. Gutschmidt, article, Kaltetechnik, vol. 15, no. 6, June 1963, pp. 170-177; no. 7, July 1963, pp. 200-204, illus., printed in German. Verlag C.F. Miller, Karlsruhe, Germany.

FUR SEALS:

"Evolution of fur seal management on the Pribilof Islands," by Alton Y. Roppel and Stuart P. Davey, article, Science in Alaska, Proceedings of the Fourteenth Alaskan Science Conference, Anchorage, Alaska, August 27-30, 1963, pp. 67-68, printed. Executive Secretary, Alaska Division, American Association for the Advancement of Science, College, Alaska.

GEAR:

"A modified Petersen grab," by J. Flury, article, Journal of the Fisheries Research Board of Canada, vol. 20, no. 6, 1963, pp. 1549-1550, illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

"O rabote setevyborochnykh mashin razlichnykh typov" (On working performance of net-hauling machines of different types), by R. T. Mikhailov, article, Rybnoe Khoziaistvo, vol. 38, no. 1, 1962, pp. 59-64, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

"Sinteticheskiye materialy dlya osnastki orudi lova" (Synthetics for fishing gear), by V. V. Borishchev, article, Rybnoe Khoziaistvo, vol. 39, no. 2, 1963, pp. 63-67, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

GENERAL:

Fish and Wildlife, Price List 21, 15 pp., printed, April 1964 (49th Edition). Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. A complete list of publications on fish and wildlife subjects for sale by the Government Printing

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Office. Titles are compiled alphabetically according to subject, with catalog number, total pages, date of publication, and price included. An occasional descriptive sentence is shown.

GERMAN FEDERAL REPUBLIC:

"Republique Federale d'Allemagne: La modernisation de la flotte de grande peche et le programme d'aide gouvernementale" (Federal Republic of Germany: Modernization of the distant-water fishing fleet and the government's aid program), article, La Peche Maritime, vol. 43, no. 1035, June 20, 1964, pp. 443-446, illus., printed in French, single copy 20 francs (about US$4.05). La Peche Maritime, 190, Boulevard Haussmann, Paris 8e, France.

GLAZING:

"Experiment of protective effect of paste glazing made from methylcellulose, sodium carboxymethylcellulose and hydroxyethylcellulose," by K. Tanaka, article, Refrigeration (Reito), vol. 38, no. 427, May 1963, pp. 1-13, printed. Japanese Association of Refrigeration, Kenchiku Kaikan Bldg., 3-1 Ginza Nishi, Chuo-ku, Tokyo, Japan.

GREECE:

Foreign Trade Regulations of Greece, by A. Russell Romer, OBR 64-66, 8 pp., printed, June 1964, 15 cents. Bureau of Foreign Commerce, U.S. Department of Commerce, Washington, D.C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.) Discusses Greece's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. Also covers special customs provisions, nontariff import controls, and Government representation between Greece and the United States.

HADDOCK:

"Further field experiments with tags for haddock," by Albert C. Jensen, article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 194-203, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S., Canada.

"Haddock tag returns in relation to fish condition," by John P. McDermott and Robert Livingstone, Jr., article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 216-217, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S., Canada.

"A study of the vertical distribution of larval haddock," by David Miller, John B. Colton, Jr., and Robert R. Marak, article, Journal du Conseil, vol. 28, no. 1, August 1963, pp. 3-49, printed. Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark.

HAKE:

"An analysis of silver hake tag returns," by Raymond L. Fritz, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 214-215, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S. Canada.

HERRING:

"Caught in a hail of herring," by Edgar P. Young, article, World Fishing, April 1964, pp. 60, 63-64, illus., printed. John Trundell & Partners Ltd., St. Richard's House, Eversholt St., London NW1, England. An account of six cruises by the Soviet research submarine Severyanka in the Barents Sea, January 1959-July 1963. Observations were made off the Murmansk coast of the way in which herring and other fish behave and distribute themselves during their winter migration, when they are usually in a somnolent condition. Observations of plankton concentrations, as well as conditions for best observing trawl operations, were carried out. These cruises, besides producing much interesting information which is of practical use for the fishing industry, have vindicated the great value of submarines as instruments for carrying out research in oceanography and gear utilization.

"Forecast for Scottish North Sea and west coast herring fisheries in 1964," by B.B. Parrish and A. Saville, article, Scottish Fisheries Bulletin, no. 21, June 1964, pp. 3-5, printed. Fisheries Division, Department of Agriculture and Fisheries for Scotland, Edinburg, Scotland.

"New techniques in herring fishing," by Jakob Jakobsson, article, Iceland Review, vol. 2, no. 2, 1964, pp. 44-46, 49, illus., printed, single copy 50 Icelandic Kronur (about US$1.16). Iceland Review, P.O. Box 1238, Reykjavik, Iceland.

"Prisposobitel'nye i izmeneniya rosta salaki Clupea harengus membras L. Rizhskogo zaliva v svyazi s obespechennost'yu pishchei" (Adaptive changes in the growth rates of herring, Clupea harengus membras L., of the Gulf of Riga in connection with the availability of food), by A.V. Chepurnov, article, Voprosy Ikhtiologii, vol. 3, no. 1, 1963, pp. 124-130, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

"A revision of the recent round herrings (Pisces: Dussumieriidae)," by P.J.P. Whitehead, article, British Museum (Natural History) Bulletin, vol. 10, no. 6, 1963, pp. 305-380, illus., printed. British Museum (Natural History), London, England.

"Scales and earstones reveal age of Atlantic herring," by H.C. Boyar, article, Maine Field Naturalist, vol. 19, no. 3, March 1963, 2 pp., printed. Maine Audubon Society, and Portland Society of Natural History, 22 Elm St., Portland, Maine.

"O sel'dyanom rybolovstve v zapadnoi Atlantike" (On herring fishing in the western Atlantic), by I.G. Yudanov, article, Rybnoe Khoziaistvo, vol. 39, no. 2, 1963, pp. 14-18, printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

ICHTHYOLOGY:

The Study of Fishes Made Simple, by Eugene V. Mohr, 159 pp., illus., printed, 1962. Doubleday & Co., Garden City, N.Y.

INDIAN OCEAN:

Indian Ocean Project. Measurements of Currents Along the Equator in the Indian Ocean, by John A. Knauss and Bruce A. Taft, 4 pp., illus., printed, 1963. (Reprinted from Nature, vol. 198, no. 4878, 1963.)

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Rhode Island University, Narragansett Marine Laboratory, Kingston, R.I.

INTERNATIONAL COMMISSIONS:

(International Pacific Salmon Fisheries Commission) Annual Report, 1963, 45 pp., illus., printed, 1964. International Pacific Salmon Fisheries Commission, P.O. Box 1120, New Westminster, B. C., Canada. Describes the adverse effects of interruption in fishing by strikes or lockouts on total racial production of Fraser River sockeye salmon populations; history of salmon runs in that area; and results of regulation of the catches. Discusses the 21 formal meetings of the Commisssion held in 1963; regulations for fishing in Canadian and United States Convention waters, and emergency amendments promulgated; the sockeye salmon fishery, escapement, and rehabilitation; the pink salmon fishery, origin of catch, and escapement; and watershed protection of salmon rivers by means of flood control, fishway construction, and other devices. Includes statistical data on sockeye salmon catch by gear; cyclic landings and packs of sockeye from Convention waters; daily catches of sockeye and pinks from United States and Canadian Convention waters; Indian catches of sockeye; and escapement of sockeye and pinks to Fraser River and other spawning areas.

North-East Atlantic Fisheries Commission, Report of the Second Meeting, May 1964, 28 pp., processed in French and English, 1964. North-East Atlantic Fisheries Commission, Rm. 617, East Block, Whitehall Pl., London SW1, England. Contains a report of the proceedings of the second meeting of the North-East Atlantic Fisheries Commission, The Hague, May 12-15, 1964. The 14 member Governments, all in Europe, were represented by delegations; the United States Government, the International Council for the Exploration of the Sea (ICES), and the International Commission for the Northwest Atlantic Fisheries (ICNAF) sent observers. The Commission ruled on the area for application of minimum mesh size regulations; extended permission for use of top-side chafers on vessels until January 1, 1966; and agreed to special arrangements for allowing small boats to fish for whiting with small mesh nets in the Skagerak-Kattegat area of the North Sea. The Commission decided to request the ICES to conduct: an assessment of effects of top-side chafers on net selectivity; a reassessment of fish stocks in the northeastern part of the Convention Area; a study of the spiny dogfish stock and the effect of possible conservation measures; and a continuing study of herring stocks. Agreement was reached on the need for a system of international control of fisheries on the high seas for enforcement of conservation measures. Therefore a resolution was passed that a special committee, on which all member Countries would be represented, should be established to study the practical problems involved and to make suggestions to the Commission at its next meeting. Plans were made to hold the third meeting in Moscow, May 11, 1965.

ITALY:

Bollettino di Pesca, Piscicoltura e Idrobiologia, vol. 18, no. 1, January-June 1963, 100 pp., illus., printed in Italian with English abstracts, single copy L. 1,200 (about US$1.90). Laboratorio Centrale di Idrobiologia, Piazza Borghese, 91, Rome, Italy. Includes, among others, articles on: "Sul problema igienico della conservazione degli alimenti: prove organolettiche e sperimentali per differenziare il pesce scongelato dal pesce fresco semplicemente refrigerato" (Some hygienic problems of food preservation: organoleptic inspection and laboratory tests for differentiating frozen fish from refrigerated fish), by Stefano Caracciolo; and "La pesca con la rete 'gangamella' nel golfo di Napoli" (Fishing with the "gangamella" trawl net in the Gulf of Naples), by Mario Santarelli and Giuseppe Micale.

JAPAN:

Data Record of Oceanographic Observations and Exploratory Fishing, No. 8, 311 pp., illus., printed in Japanese and English, March 1964. The Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido, Japan. Covers exploratory cruises to the Coral Sea, the Southern Kurile Waters, Okhotsk Sea, Indian Ocean, Bering Sea, and Northwestern North Pacific, 1962/1963.

Measures Planned for Implementation for the Coastal Fisheries in 1964, 29 pp., printed in Japanese. Japanese Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-Ku, Tokyo, Japan. "White paper" on Japan's fisheries prepared for submission to the 46th (Regular) Diet Session.

1963 Annual Report on Fisheries Trends (Part 1--Report on Fisheries Trends. Part 2--Report on Measures Implemented for the Coastal Fisheries.), 112 pp., illus., printed in Japanese. Japanese Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-Ku, Tokyo, Japan. "White Paper" on Japan's fisheries prepared for submisssion to the 46th (Regular) Diet Session.

JELLYFISH:

"Opredeleniie meduzy v tolshche vody" (Determination of the presence of jellyfish in midwater), by M. I. Spectorov, article, Rybnoe Khoziaistvo, vol. 37, no. 12, 1961, pp. 38-39, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

LIVESTOCK FEED:

"A comparison of Queensland whalemeals and fish meals as a protein supplement for grain-fed pigs," by A.C.E. Todd, article, Australian Journal of Experimental Agriculture and Animal Husbandry, vol. 3, p. 69, printed. Australian Journal of Experimental Agriculture and Animal Husbandry, 226 Clarendon St. East Melbourne C2, Victoria, Australia.

"Effect of the conditions of flame drying on the biological value of herring meals for pigs," by J. Delort-Laval and S. Z. Zelter, article, Annales Zootechnie, vol. 12, 1963, p. 193, printed in French. Institut National de la Recherche Agronomique, 149 Rue de Grenelle, Paris (7e), France.

Fisheries Management and Fish Byproducts in Livestock Feeding, U.S.S.R., OTS 64-31383, 33 pp., illus., processed, June 1, 1964, $1. (Translated from the Russian, Rybnoe Khoziaistvo, no. 2, 1964.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

"Herring meal, antioxidants and meat products - results of feeding trials," by H. Astrup, H. Hvidsten,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

and L. Aure, article, Zeitschrift fur Tierphysiologie Tierernährung Futtermittelkunde, vol. 17, 1962, p. 325, printed in German with English summary. Verlag Paul Parey, Spitalerstrausse 12, Hamburg, Germany.

"Quality and quantity of protein in fattening rations for pigs. I--Soyabean meal, spray-dried skimmed milk and fish meal as protein supplements for rapid fattening of pigs," by F. Witczak, M. Kotarbinska, and F. Abgarowicz, article, Nutrition Abstracts and Reviews, vol. 34, 1964, pp. 262, printed. Commonwealth Bureau of Animal Nutrition, Rowett Institute, Aberdeen, Scotland.

LOBSTER:
"Artificial hatching and rearing of lobsters--a review," by H. J. Thomas, article, Scottish Fisheries Bulletin, no. 21, June 1964, pp. 6-9, printed. Fisheries Division, Department of Agriculture and Fisheries for Scotland, Edinburg, Scotland.

LUMPFISH:
Review of Genera and Species of Fishes of the Subfamily Cyclopterinae (Pisces) (Obzor Rodov i Vidov Ryb Podsemeistva Cyclopterinae (Pisces), by G. U. Lindberg and M. I. Legeza, OTS 61-31032, 75 pp., illus., processed, 1964, 75 cents. (Translated from the Russian, Trudy Zoologicheskogo Instituta Akademii Nauk SSSR, vol. 18, 1955, pp. 389-458.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

MACKEREL:
"Tsitofiziologicheskii analiz raspredeleniya molodi 'krupnoi' stavridy (Trachurus mediterraneus ponticus) v severnom i vostochnom raionakh chernogo morya" (Cytophysiological analysis of distribution of the young of "large" horse mackerel--Trachurus mediterraneus ponticus--in the northern and eastern Black Sea regions), by Yu. P. Altukhov, article, Zoologicheski Zhurnal, vol. 42, no. 4, 1963, pp. 589-595, illus., printed in Russian with English summary. Four Continent Book Corp., 156 5th Ave., New York, N. Y. 10010.

MAINE:
22nd Biennial Report (for Period July 1, 1960 to June 30, 1962), 48 pp., illus., printed. Department of Sea and Shore Fisheries, State of Maine, State House, Augusta, Maine. Reviews the programs of the Department of Sea and Shore Fisheries, 1960/62, with details on enforcement, inspection, supervision of salt-water sport fishing, rivers and harbors projects, progress in the lobster industry, proposed lobster research, assistance to the sardine industry, and other topics. Also covers work of the Promotion and Marketing Division in providing publicity, quality control, and other assistance to Maine's commercial fisheries. Chapters on accomplishments of the Enforcement, Marine Research, and Statistics Divisions are included.

MARINE ALGAE:
The Marine Algae of Jamaica. Part 1--Myxophyceae and Chlorophyceae, Part 2--Phaeophyceae and Rhodophyceae, by V. J. Chapman, Bulletin of the Institute of Jamaica, Science Series, No. 12, 160 pp., and 201 pp., respectively, illus., printed, 1961 and 1963. The Institute of Jamaica, Kingston, Jamaica.

MENHADEN:
The Texas Menhaden Fishery, by Ernest G. Simmons and Joseph P. Breuer, Bulletin No. 45, Series No. 2, Coastal Fisheries, 16 pp., illus., printed revised 1964. Texas Parks and Wildlife Department, John H. Reagan State Office Bldg., Austin, Tex. Discusses the biology, fishing operations, products, and economic value of the menhaden, one of the Gulf of Mexico's most valuable fish. Includes photographs and explanatory diagrams.

MEXICO:
Anuario Estadistico de Actividades Pesqueras en Aguas Territoriales Mexicanas, 1958 (Annual Statistical Report of Fishery Activities in Mexican Territorial Waters, 1958), 347 pp., printed in Spanish, 1963. Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F. Contains statistical tables on quantity and value of landings in Mexico during 1958 by species, by states and territories, and by months; quantity of processed edible and industrial fishery products by types; production of fish and shellfish by cooperatives and by private industry; and other similar data.

MINK FEED:
"Increasing amounts of fish meal and whalemeat meal in feeds for young mink, and periodical feeding with 100 percent of the fresh animal feeds replaced by dried animal feeds," by G. Jørgensen, G. Hillemann, and H. Clausen, article, Dansk Pelsdyravl, vol. 26, 1963, p. 364, printed in Danish. Dansk Pelsdyravl, Sdeasdy 8, Copenhagen, Denmark.

"Trials with different amounts of fish meal in the feed of young mink," by G. Jørgensen, article, Dansk Pelsdyravl, vol. 26, 1963, pp. 104, 106, 109, 171, 177, printed in Danish. Dansk Pelsdyravl, Sdeasdy 8, Copenhagen, Denmark.

MOROCCO:
"La industria de conservas de pescado marroqui y el Mercado Comun" (The Moroccan fish canning industry and the Common Market), article, Industria Conservera, vol. 30, no. 298, April 1964, pp. 93-94, printed in Spanish. Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

MULLET:
"The structure of polyenoic odd- and even-numbered fatty acids of mullet (Mugil cephalus)," by Nirmal Sen and Hermann Schlenk, article, Journal of the American Oil Chemists' Society, vol. 41, March 1964, pp. 241-247, printed. American Oil Chemists' Society, 35 E. Wacker Dr., Chicago 1, Ill.

NETS:
"Cook Inlet set-netters," by Dolores D. Roguszka, article, Alaska Sportsman, vol. 30, no. 8, August 1964, pp. 6-11, 54, illus., printed, single copy 50 cents. Alaska Sportsman, Suite 10, Box 1271, Juneau, Alaska. Adventure story of a Danish family of fishermen and its success with net fishing in Alaska. Readably written, the article contains numerous photographs.

"Probleme der messwertubertragung vom netz zum schiff" (Problems connected with the transmission of measured quantities from the net to the vessel), by L. Wolff, article, Fischereiforschung, vol. 5, no. 5,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

1962, pp. 3-7, illus., printed in German. Institut fur Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, East Germany.

NORWAY:

Fiskeriinspektorenes og Samvirkekonsulentenes Virksomhet 1962 (Activities of Fishery Inspectors and Cooperatives Consultants, 1962), Arsberetning Vedkommende Norges Fiskerier, No. 11-12, 1962, 61 pp., printed in Norwegian, 1963. A.s John Griegs Boktrykkeri, Bergen, Norway.

"Die Norwegische tiefkuhlindustrie" (The Norwegian industry of deep-frozen products), article, Ties Kuhlkette, no. 92, August 1963, p. 10, illus., printed in German. H. E. Albrecht Verslag K. G., Freihamerstrasse No. 2, Munich, Germany.

OCEANOGRAPHY:

CALCOFI Atlas of 10-Meter Temperatures and Salinities, 1949 through 1959, California Cooperative Oceanic Fisheries Investigations Atlas No. 1, 1 vol. illus., printed, 1963. Marine Research Committee, Department of Fish and Game, Sacramento, Calif.

"Developing tropical Atlantic fisheries through international research," by Vernon E. Brock, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 152-155, printed, April 1963. Gulf and Caribbean Fisheries Institute, Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

"Fishery oceanography in the tropical Atlantic," by Robert C. Wilson, article, Transactions of the Twenty-Seventh North American Wildlife and Natural Resources Conference, March 12, 13, and 14, 1962, pp. 351-361, printed, February 1963. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

The Global Sea, by Harris B. Stewart, Jr., Van Nostrand Searchlight Book No. 17, 126 pp., illus., printed, 1963, $1.45. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. Knowledge of the seas and their resources is still limited as compared to man's knowledge of the land and even of space. But in the past 20 years a change has taken place and man has begun to realize the importance of the global sea. There have been many books written about the seas, and many more will follow. Whereas many are too detailed or too technical for the general reader, here is a small paperbound book which is a general and an adequate introduction to the seas--their buried landscapes, moving waters, marine plants and animals, and other resources and riches. Something about the more recent discoveries and research results in the study of the sea--oceanography--is presented in non-technical language. The last chapter deals with territorial waters (a controversial issue among nations today), and international cooperation in oceanography. For those who would like to delve deeper into the subject, there is a small bibliography. The book also has a small but adequate index. Covering more than 70 percent of our globe's surface, the oceans are man's last frontier on earth. The potential that the oceans hold for the betterment of mankind is just beginning to be fully realized. Any reader, no matter what his interests, will gain something of the fascination of the seas from this short summary. Students and the general public as well as those interested in any aspect of the global sea will find this as the key that will unlock the door to man's last frontier on earth.

--Joseph Pileggi

"The International Cooperative Investigation of the Tropical Atlantic," by Vernon E. Brock, article, ICO Pamphlet No. 11, pp. 33-37, printed, April 1963. Interagency Committee on Oceanography, Office of Naval Research, Rm. 1818, 17th St., and Constitution Ave. NW., Washington, D. C. 20333.

Man and the Sea, by Joel W. Hedgpeth, 28 pp., printed, April 15, 1964, $2.60. Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230. The topics covered in this series of three lectures are the general principles of marine biology and oceanography, the role of marine biological stations in marine research, and the natural resources of the sea.

Oceanological Principles as Related to the Fishery Productivity of the Seas, by G. K. Izhevskii, OTS 63-11120, 193 pp., illus., processed, 1964, $2.00. (Translated by A. Birron and Z. S. Cole, from the Russian Pishchepromizdat, Moscow, 1961.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Opportunities in Oceanography, by E. John Long, Publication No. 4537, 34 pp., illus., printed, July 1964, 50 cents. The Smithsonian Institution, Washington, D. C. 20560. Discusses the need for young people in the various fields of oceanographic work, the challenges to be found in the seas, types of oceanographic research and qualities required to perform them, and other related sciences. Also covers various types of oceanographic cruises, the work of land-based laboratories, the Federal Government's part in this research work, and oceanography in industry. Information is given on how to become an oceanographer, the value of sea experience, obtaining financial assistance, how and where to study, qualifications for Federal employment, and the availability of scholarships and assistanceships. A final word is given on expected future accomplishments in oceanography and the hope of the late President John F. Kennedy that we may "drive back the frontiers of the unknown in the waters which encircle our globe."

"Overview of Government-Industry Oceanographic Instrumentation Symposium," by Julius Rockwell, Jr., article, Proceedings of the Navy Research and Development Clinic, Raton, New Mexico, September 1961, pp. C-1-C-6, printed, 1963. Office of Naval Research, Rm. 1818, 17th St. and Constitution Ave. NW., Washington, D. C. 20333.

OCEAN PERCH:

"Effect of tagging on redfish growth rate at Eastport, Maine," by George F. Kelly and Allan M. Barker, article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 210-213, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Estimation of population size and mortality rates from tagged redfish, Sebastes marinus L., at Eastport, Maine," by George F. Kelly and Allan M. Barber, article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 204-209, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada.

OYSTERS:
Experiments in Oyster Culture, by Luis Castillo, Translation Series No. 367, 11 pp., printed, 1961. (Translated from the Spanish, Imprenta Cervantes, vol. 50, 1910.) Fisheries Research Board of Canada, Biological Station, St. Andrews, N. B., Canada.

"The Government-industry co-operative oyster research program. III--Processing studies; IV--Procedure for determining solids change," by A. Kramer and others, articles, Journal of the Association of Official Agricultural Chemists, vol. 45, 1962, pp. 1011-1050, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

"Index of condition and percent solids of raft-grown oysters in Massachusetts," article, Proceedings of the National Shellfisheries Association, vol. 52, pp. 47-52, printed, June 1963, National Shellfisheries Association, Virginia Institute of Marine Science, Gloucester Point, Va.

"El mercado inglés de la ostra" (The English market for oysters), article, Informacion Conservera, vol. 12, no. 123-124, March-April 1964, p. 112, printed in Spanish, single copy 30 pesetas (about 50 U. S. cents). Informacion Conservera, Colón, 62, Valencia, Spain.

"Progress in oyster mortality studies," by James B. Engle and Aaron Rosenfield, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 116-124, April 1963. Gulf and Caribbean Fisheries Institute, Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

PERU:
Estudio de la Fauna Ictiologica de los Esteros y Parte Baja de los Rios del Departamento de Tumbes (Peru) (Study of the Ichthyological Fauna of the Estuaries and Lower Reaches of the Rivers of the Department of Tumbes, Peru), by Norma Chirichigno F., Serie de Divulgacion Cientifica 22, 87 pp., illus., printed in Spanish, 1963. Servicio de Pesqueria, Ministerio de Agricultura, Lima, Peru.

PESTICIDES:
"Pesticides - a new factor in coastal environments," by Philip A. Butler and Paul F. Springer, article, Transactions of the Twenty-Eighth North American Wildlife and Natural Resources Conference, March 4, 5, and 6, pp. 380-390, printed. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

POLLUTION CONTROL:
"Aquatic life needs protection," by Clarence M. Tarzwell, article, Chemical Engineering Progress, vol. 59, no. 11, November 1963, pp. 27-28, illus., printed, single copy $3. American Institute of Chemical Engineers, Editorial and Advertising Offices, 345 E. 47th St., New York, N. Y. 10017. Prime objective of aquatic biologists in the water pollution field is to set up water quality criteria essential for the protection and maintenance of aquatic life, according to the author. These standards must protect the most sensitive species; average conditions are a poor measure since extremes of environment can render streams unfit for fish the year round. It is suggested that tentative water quality criteria be established immediately and that research be conducted to devise methods by which organisms can be used in the transformation of waste matter into useful material.

POULTRY FEED:
"Comparison of the nutritive value of fish meal and fermented fish meal in chick rations," by N. Reyntens and L. Keppens, article, Revue de l' Agriculture, Brussels, vol. 15, 1962, p. 1520, printed. Ministre de l' Agriculture, 14 Rue de la Limite, Brussels 3, Belgium.

POULTRY NUTRITION:
"The action of fish meal of different origins on the growth of chicks," by R. Fangauf, H. Vogt, and W. Penner, article, Archiv fur Geflugelkunde, vol. 27, part 2, 1963, p. 135, printed in German. Fritz Pfenniustorff, Herworthstrasse 3, Berlin-Lichlerfelde-1, Germany.

QUALITY:
Determinacao Quantitativa do Ranco por Auto-Oxidacao pelo Acido 2-Tiobarbutirico (Quantitative Determination of Rancidity through Autoxidation by Use of 2-Thiobarbutiric Acid), by Luis Torres, and Romano Granger, Notas Mimeografadas No. 31, 13 pp., illus., processed in Portuguese with French and Spanish summaries, 1962. Centro de Biologia Piscatoria, Lisbon, Portugal.

"Direct gas chromatographic analysis as an objective method of flavor measurement," by W. W. Nawar and I. S. Fagerson, article, Food Technology, vol. 16, no. 11, 1962, pp. 107-109, illus., printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

"Discoloration of marine animal products. Part I," by Masamichi Toyomizu and Yukio Tomiyasu, article, Chemical Abstracts, vol. 59, October 28, 1963, 10695e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

The Sensory Assessment of Iced Whitefish by a Panel Technique, by J. M. Shewan and A.C.S. Ehrenberg, Torry Memoir No. 88, 7 pp., illus., printed in English with French and Spanish summaries, 1962. Torry Research Station, Aberdeen, Scotland.

"The significance of variations in the nucleotide, amino acid, and carbohydrate contents of fish muscle in relation to quality evaluation," by F. Bramstedt, article, Chemical Abstracts, vol. 58, March 4, 1963, 4972c, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

RADIOACTIVE WASTES:
"Accumulation of radionuclides by aquatic organisms," by Theodore R. Rice, article, Studies of the Fate of Certain Radionuclides in Estuarine and Other Aquatic Environments, Public Health Service Publication No.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

999-5-3, pp. 35-50, printed, May 1963. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. 20201.

"Savannah estuary environmental radiological survey (SEERS) project," by Julius J. Sabo, John P. Baptist, and Fred G. Rueter, article, Studies of the Fate of Certain Radionuclides in Estuarine and Other Aquatic Environments, Public Health Service Publication No. 999-R-3, pp. 11-33, printed, May 1963. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. 20201.

REFRIGERATION:

"Kaltetechnische einrichtung von fischfang und -fabrikschiffen" (Refrigerating plants on board fishing-boats and factoryships), by W. Flechtenmacher, article, Kaltetechnik, vol. 15, no. 10, October 1963, pp. 314-320, illus., printed in German. Verlag C. F. Miller, Karlsruhe, Germany.

RESEARCH VESSEL:

"Flip Returns from Mid-Pacific Research Cruise," by John Northrop, 1 p., printed, March 1964. (Reprinted from Transactions, American Geophysical Union, vol. 45, no. 1, March 1964, p. 165.) Marine Physical Laboratory, University of California, San Diego, Calif.

"Porpoise--Summary Report," by K. R. Marsh, Report No. 2 55400 4R50209, 24 pp., printed, June 10, 1964. Ling-Tempo Vought, Dallas, Tex. Describes a buoyancy-propelled underwater vehicle designed for utilization initially as an oceanographic research vessel. Intended to descend and ascend alternately as it glides through the water. Buoyance control is utilized to effect the depth change and to obtain a thrust force along the flight path. Vessel is equipped with wings hinged on a skewed axis for stability.

Predictions of the Collapse Strength of Three HY-100 Steel Spherical Hulls Fabricated for the Oceanographic Research Vehicle "Alvin," by Thomas J. Kiernan, DTMB 1792, 41 pp., printed, March 1964, $1.25. Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

"Report on the new Albatross IV," by Robert L. Edwards, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 55-59, printed, 1963. Gulf and Caribbean Fisheries Institute, Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

ROE:

"Color changes on fish roe products dyed black," by J. Winziger, article, Chemical Abstracts, vol. 59, August 5, 1963, 9401e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

SALMON:

"Atlantic salmon in the U.S.S.R.," by Nikolai I. Kozhin, article, The Atlantic Salmon Journal, no. 2, June 1964, pp. 3-4, 7, illus., printed. Atlantic Salmon Association, 1559 McGregor St., Montreal 25, Canada. Discusses the occurrence of the Atlantic salmon (Salmo salar L.) in the Baltic, Barents, and White Seas; fluctuations of the catch from year to year; and average annual catch, 1954-56, of about 3.7 million pounds. Also covers the management of Atlantic salmon rivers; the rearing of smolt in 10 months with a special feed; Soviet research agencies concerned with artificial salmon breeding and other biological activities; efforts to acclimatize two Pacific salmon species (Oncorhynchus keta and O. gorbuscha) to Atlantic environments; and Soviet membership in international organizations concerned with salmon.

Comparative Analysis of the Desmoltification Process Among the Young of Different Ecological Forms of Atlantic Salmon, by N. V. Evropeytseva, Translation Series No. 431, 24 pp., illus., printed, 1963. (Translated from the Russian, Uchenye Zapiski Leningradskogo Gosudarstvennogo Universiteta, no. 311, 1962, pp. 46-73.) Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada.

"Influence of freshwater environment on survival of coho salmon," by William A. Smoker, article, Proceedings of the Sixteenth International Congress of Zoology, vol. 1, 1963, p. 245, printed. Secretary, Permanent Committee of International Zoological Congresses, 105 Blvd. Raspail, Paris 6, France.

"Nutrition of salmonoid fishes. XI--Iodine requirements of chinook salmon," by A. N. Woodall and Gilles LaRoche, article, Journal of Nutrition, vol. 82, April 1964, pp. 475-482, printed. American Institute of Nutrition, 36th St. at Spruce, Philadelphia 4, Pa.

"Opyt akklimatizatsii gorbushi i kety v basseine Barentsova i Belogo morei" (Experimental acclimatization of pink and chum salmon in the basin of the Barents and White Seas), by V. V. Azbelev and S. S. Surkov, article, Akklimatizatsia zhivotnykh v SSSR, pp. 210-211, printed in Russian, 1963. Akademiia Nauk Kazakhskoi SSSR, Alma-Ata, U.S.S.R.

"Passage of salmon fingerlings through small tunnels," by Theodore H. Blahm, article, Transactions of the American Fisheries Society, vol. 92, no. 3, July 1963, pp. 302-303, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

"Produtsirovanie spermy tikhookeanskimi lososyami roda Oncorhynchus" (Sperm production in Pacific Ocean salmon of the genus Oncorhynchus), by A. I. Smirnov, article, Voprosy Ikhtiologii, vol. 3, no. 1, 1963, pp. 84-98, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

"The reproduction of salmon in Scandinavia and the British Isles," by Wilfred M. Carter, article, The Atlantic Salmon Journal, no. 2, June 1964, pp. 22-26, illus., printed. Atlantic Salmon Association, 1559 McGregor St., Montreal 25, Canada.

"Scientists probe riddle of salmon's death," article, The Atlantic Salmon Journal, no. 2, June 1964, pp. 20-21, illus., printed. Atlantic Salmon Association, 1559 McGregor St., Montreal 25, Canada.

"Study of amino acids, free or as components of protein, and of some B-vitamins in the tissues of the Atlantic salmon, Salmo salar, during spawning migration," by C. B. Cowey, K. W. Daisley, and G. Parry,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

article, Comparative Biochemistry and Physiology, vol. 7, 1962, p. 29, printed. Comparative Biochemistry and Physiology, 122 E. 55th St., New York 22, N.Y.

SALT FISH:

A Report to the Fishing Industry on a Method for the Accelerated Cooling of Green, Heavily Salted Fish, by A. L. Wood, New Series Circular No. 12, 2 pp., processed, 1962. Technological Station, Fisheries Research Board of Canada, P.O. Box 429, Halifax, N.S., Canada.

SAURY:

"Lov sairy nasosom s primeneniem sveta i eletrotoka" (Pacific sauries taken by pump with the help of light and electric current), by I.V. Nikonorov and A. Kh. Pateev, article, Rybnoe Khoziaistvo, vol. 39, no. 2, 1963, pp. 51-53, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R. Reviews the use of pumps and lights for catching sprat in the Caspian Sea. This method was used experimentally for catching other fish, particularly Pacific sauries, in other regions but did not give satisfactory results until 1962. A successful standard fish-pumping installation is illustrated in this article. Though research and experiments are not completed, the authors recommend that a few vessels be equipped with fish-pumping installations for commercial purposes.

SCALLOPS:

"Tagging as a technique in population studies of the sea scallop," by J. A. Posgay, article, North Atlantic Fish Marking Symposium, Special Publication No. 4, pp. 268-271, printed, 1963. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S., Canada.

SEA LAMPREY:

The Use of Alkalinity and Conductivity Measurements to Estimate Concentrations of 3-trifluormethyl-4-nitrophenol Required for Treating Lamprey Streams, by Richard K. Kanayama, Technical Report no. 7, 10 pp., printed, November 1963. Great Lakes Fishery Commission, Natural Resources Bldg., University of Michigan, Ann Arbor, Mich.

SHRIMP:

"Abundance of postlarval shrimp--one index of future shrimping success," by Kenneth N. Baxter, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 79-87, printed, April 1963. Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

"Expanded research on Gulf of Mexico shrimp resources," by Joseph H. Kutkuhn, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 68-79, printed, April 1963. Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

The Recent Genera of the Caridean and Stenopodidean Shrimps (Class Crustacea, Order Decapoda, Supersection Natantia) with Keys for Their Determination, by Lipke B. Holthuis, 157 pp., illus., printed, 1955. E. J. Brill, Oude Rijn, 33a, Leiden, Netherlands.

"On some aspects of quality of cooked frozen prawns," by V. Krishna Pillai and A. Lekshmy, article, Indian Journal of Fisheries, vol. 8, October 1961, pp. 440-448, printed. Ministry of Food and Agriculture of Government of India, New Delhi, India.

SMALL BUSINESS MANAGEMENT:

Following issued by Small Business Administration, Washington, D. C. 20416:

How Do You Know What Your Business is Worth? by G. H. B. Gould and Dean C. Coddington, Management Aid for Small Manufacturers No. 166, 4 pp., processed, August 1964. Although small businessmen need to place a value on their businesses when negotiating for funds, when settling estates, or when selling out, there is no standard formula for determining value. Often value is subjective--what a person thinks the business is worth to him. This leaflet discusses three methods for estimating value: asset valuation, market worth, and capitalized earnings value. In this last method, two steps are used. First, you find a company's true earning power, based on both its past experience and future probabilities. Second, you capitalize these earnings at a rate which is realistic for the risks involved. The leaflet concludes that the capitalized earnings approach is the most valid because that method embodies all the factors in valuation.

Pricing, Production, and Marketing Policies of Small Manufacturers, by Robert F. Lanzillotti and Gordon O. Parrish, Management Research Summary, 2 pp., processed, 1964. The study discussed in this summary is based on an analysis of the pricing practices of 256 small manufacturers located in the State of Washington and having fewer than 250 workers. Typically, more than half the production of the firms consisted of standard products for inventory. Generally these firms did not make detailed analysis of production and distribution costs. They relied heavily on rules-of-thumb in their pricing. About three-fourths of them tried to set prices so as to realize a predetermined profit rate. Net profits on sales before taxes averaged only 5.9 percent for this group during the 1950-1959 period. However, since many of the unincorporated firms did not deduct owner-managers' salaries as a cost, they did not in fact realize any return at all on invested capital.

Problems in Small Business Management, by William Rotch, Management Research Summary, 2 pp., processed, 1963. The report summarized in this leaflet consists of a collection of case studies of small businesses and some readings related to various aspects of small-business management. Each case is a description of a real business--its people, products, and operations. Five groups of cases are presented: starting a business; developing a business; financing a firm; major expansion of a company; and special situations involving personnel or other types of problems. The purpose of the study was to develop material for a course or seminar in the management of small enterprises.

The Relation of Management Decision Making to Small Business Growth, by F. Parker Fowler, Jr. and E. W. Sandberg, Management Research Summary, 2 pp., processed, 1964. One approach to helping small businesses is based on the idea that they differ from large businesses in kind as well as in size. The study sum-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

marized in this leaflet (of 43 Colorado manufacturers with identical products) classifies the owner-managers as: the conservative operator, managing a relatively stable firm; the aggressive innovator, achieving a rapid growth pattern; and the industry stalwart, desiring status in the industry for his firm. Also shown is that the small business owner-manager differs from the hired manager in that the former specifies both his firm's goals and the means by which they are to be attained. The recommendation is made that assistance to individual firms should include the construction of internal information systems.

Value Analysis for Small Business, by Daniel D. Roman, Technical Aids for Small Manufacturers No. 87, 4 pp., processed, May-June 1964. Value analysis (sometimes called value engineering or value control) is a technique that aims to find new ways to get equal or superior performance from a product or method at lower costs, while retaining quality, function, and reliability. Its concept is that it is easier to increase profits by reducing costs than by increasing sales. Checking with experts, exchanging ideas, watching for unreasonable specifications, knowing where to get factual help, and using ingenuity instead of merely following custom and tradition--all these and more are the techniques used in value analysis. This leaflet explains the principles of value analysis and how they can be adapted to small business use; reports various instances of successful use of this technique; and makes certain suggestions for company acceptance.

SMALL CRAFT:

The following color-illustrated charts, each 23 by 37 inches, are available free from Touring Service, Mobil Oil Company, 150 E. 42nd St., New York, N. Y. 10017:

Cruising Guide 1--Eastport, Maine, to Barnegat Inlet, New Jersey, Including Long Island and New York City Waters.

Cruising Guide 2--Montreal, Canada to Key West, Florida, Including St. Lawrence River, Hudson River, Delaware Bay, and Chesapeake Bay.

Cruising Guide 3--Great Lakes, Thousand Islands, New York Waterways, Ohio River, Mississippi River, Gulf Coast from Mobile, Alabama, to Brownsville, Texas, Plus Selected Areas.

Cruising Guide 4--Pacific Coast from Puget Sound to San Diego and Colorado River.

SMOKING:

"Optimization of the electrostatic smoking process," by J. Tilgner and Z. E. Sikorski, article, Fleischwirtschaft, vol. 15, no. 5, 1963, pp. 391-395, illus., printed in German with English, French, Italian, and Spanish summaries. Verlafshaus Sponholz Gmbh, Kockstrasse 60-61, Berlin SW 68, Germany.

SPINY LOBSTER:

Contribucion al Conocimiento de las Langostas del Pacifico Mexicano y su Pesqueria (Contribution to the Knowledge of the Spiny Lobster of the Mexican Pacific Coast and Its Fishery), by Hector Chapa Saldaña, 67 pp., illus., printed in Spanish with English summary, 1964. Instituto Nacional de Investigaciones Biologico-Pesqueras, Secretaria de Industria y Comercio, Direccion General de Pesca e Industrias Conexas, Mexico, D. F.

Sobre los Estadios Larvales de la Langosta Comun PANULIRUS ARGUS (On the Larval Stages of the Spiny Lobster Panulirus argus), by Julio A. Baisre, Contribution No. 19, 37 pp., illus., printed in Spanish with English abstract, January 1964. Centro de Investigaciones Pesqueras, Instituto Nacional de la Pesca, Playa Habana, Bauta, Cuba. In this study, 121 phyllosoma larvae of the spiny lobster were found in the stomach contents of skipjack and blackfin tuna and in plankton samples collected from Cuban fishing grounds. All 11 stages, with the exception of stage III, were identified among the specimens examined.

"Lobster fishery off the southwest coast of India," by H. Miyamoto and A. T. Shariff, article, Indian Journal of Fisheries, vol. 8, no. 2, 1961, pp. 252-268, illus., printed. Indian Journal of Fisheries, Ministry of Food and Agriculture, New Delhi, India.

"Report on South African rock lobsters--Notes on the reproductive biology and size limit of S. A. rock lobsters. Part 2," by A.E.F. Heydorn, article, The South African Shipping News and Fishing Industry Review, vol. 19, no. 6, June 1964, pp. 93, 95, 97-99, 101, 103-105, illus., printed, single copy 30 cents (about 42 U.S. cents). Thomson Newspapers, South Africa (Pty.) Ltd., P.O. Box 80, Cape Town, South Africa Republic. Deals with the attainment of sexual maturity and the reproductive potential of the South African spiny lobster Jasus lalandii (Milne Edwards), and the importance of these factors in relation to the determination of minimum size limits.

SPRAT:

"O podvodnykh nabliudeniiakh za poviedeniiem kilki" (On underwater observations of the behavior of sprats), by I. V. Nikonorov, article, Rybnoe Khoziaistvo, vol. 38, no. 1, 1962, pp. 32-36, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

SQUID:

"Studies on the relationship between current boundary zones in waters to the southeast of Hokkaido and migration of the squid, Ommastrephes sloani pacificus (Steenstrup)," by Tsuneyoshi Suzuki, article, Memoirs of the Faculty of Fisheries, Hokkaido University, vol. 2, no. 2, 1963, pp. 75-153, illus., printed. Faculty of Fisheries, Hokkaido University, Hakodate, Japan.

STANDARDS:

State of California Standards and Specifications--Seafoods; Fresh, Frozen, and Processed Fish; Inspection, Testing, and Certification, T63-p-17, 87 pp., processed, August 1, 1963. Purchasing Division, Department of Finance, State of California, Sacramento, Calif. Contains the State of California specifications for fresh, frozen, and processed fish and shellfish, and inspection, testing, and certification procedures. Also incorporates all of the National Association of State Purchase Officials (NASPO) specifications for fishery products developed by the U.S. Bureau of Commercial Fisheries Gloucester Technological Laboratory. Those include specifications for frozen

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ocean-perch fillets and Pacific ocean-perch fillets; chilled and frozen cod or haddock fillets; scallops--frozen raw, frozen raw breaded and frozen fried breaded; fish portions--frozen raw, frozen raw breaded and frozen fried breaded; shrimp--raw or cooked--chilled or frozen; and shrimp--frozen raw breaded. In addition to adopting the NASPO specifications verbatim, the State requires USDI inspection and grading of all products. All standardized products purchased by the State must be U.S. Grade A quality.

STERN-TRAWLERS:

"Le premier grand chalutier portugais a pêche par l'arrière" (The first large Portuguese stern-trawler), article, La Pêche Maritime, vol. 43, no. 1035, June 20, 1964, pp. 468-471, illus., printed in French, single copy 20 francs (about US$4.05). La Pêche Maritime, 190, Boulevard Haussmann, Paris 8e, France.

"Réflexions sur les chalutiers a pêche par l'arrière et estimation des temps de manoeuvre" (Thoughts on the stern trawler and estimates of operating time), by M. Birkhoff, article, La Pêche Maritime, vol. 43, no. 1035, June 20, 1964, pp. 409-413, illus., printed in French, single copy 20 francs (about US$4.05). La Pêche Maritime, 190, Boulevard Haussmann, Paris 8e, France.

SUBMARINES FOR RESEARCH:

"Employment of submarines for scientific research," by Donald W. Strasburg, article, Proceedings of the Hawaiian Academy of Science, 38th Annual Meeting, 1962/1963, p. 13, printed, 1963. University of Hawaii, Honolulu, Hawaii.

SWEDEN:

"Aktuella ekonomiska problem inom fisket" (Present economic problem in the fishery), by Ingemar Gerhard, Svenska Vastkustifiskaren, vol. 34, no. 13-14, July 15, 1964, pp. 274-275, printed in Swedish. Svenska Vastkustfiskarnas, Centralforbund, Ekonomiutskoffet Postbox 1014, Goteborg 4, Sweden.

THAWING:

"Thawed frozen foods," article, Information Bulletin, T.R.R.F., no. 63, August 1963, p. 3, printed. The Refrigeration Research Foundation, 12 N. Meade Ave., Colorado Springs, Colo.

TOXICITY:

Fish Intoxication, Notes on Ciguatera, Its Mode of Action and a Suggested Therapy, by A. H. Banner and others, SPC TP141, 26 pp., printed, September 1963, 75 cents. Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230. Certain characteristics of the toxin causing ciguatera are reviewed, and it is pointed out that there is no method of recognizing specific fish which may bear the toxin, nor of detecting the toxin in a fish except by feeding tests, nor of destroying the toxin by any normal means of food preparation. Some aspects of the pharmacology of the toxin and a possible similarity in action of the toxin to the curariform drugs are discussed. Case histories are presented in which recovery, partial or complete, might be attributed to neostigmine or neostigmine-Tensilon therapy. Chemical and pharmacological studies are reviewed which show similarities between the toxin found in a barracuda from Guam and red snappers from the Line Islands.

"Japanese puffer fish," article, Science News Letter, vol. 86, no. 9, August 29, 1964, p. 139, printed, single copy 15 cents. Science Service, 1719 N. St. NW., Washington, D. C. 20036.

"Toxicological action of sodium pentachlorophenol and hexachlorophene on fish and other aquatic animals," by Hans Joachim Bandt and Dietwart Nehring, article, Chemical Abstracts, vol. 58, April 29, 1963, 9451g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

TRAWLING:

"Size selection of fish by otter trawls: results of recent experiments in the Northwest Atlantic," by John R. Clark, Special Publication No. 5, pp. 24-96, printed, 1963. International Commission for the Northwest Atlantic Fisheries Commission, Bedford Institute of Oceanography, P.O. Box 638, Dartmouth, N.S., Canada.

"Za traleniia na povyshennykh skorostaikh" (Trawling at increased speeds), by V.I. Kaplan, A.B. Lishin, and E.I. Zaitsev, article, Rybnoe Khoziaistvo, vol. 38, no. 5, 1962, pp. 30-44, printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

TUNA:

"Detection of green-meat tuna before cooking," by Chujiro Nagaoka and Naotatsu Suzuki, article, Food Technology, vol. 18, May 1964, pp. 183-187, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

"Refrigeration and freezing plant for tuna fishing boats," article, Sabroe News, no. 54, June 1963, illus., printed. Thomas Sabroe and Co. Ltd., Aarhus, Denmark.

"Ricerche sugli amminoacidi del tonno in Scatola" (Studies on Amino Acids in Canned Tuna), by Duilio Pirati, article, Industria Conserve, vol. 39, no. 2, April-June 1964, pp. 102-107, illus., printed in Italian with English summary, single copy L. 1,500 (about US$2.40). Stazione Sperimentale Industria Conserve Alimentari, Viale Tanara 33, Parma, Italy.

"Tuna trolling and its prospects in New Caledonia," by R. Criou, article, Technical Paper, no. 134, 1961, pp. 1-13, illus., processed. South Pacific Commission, Box 5254, G.P.O., Sydney, Australia.

"Will tuna research change direction?" by Vernon E. Brock, article, Proceedings of the Gulf and Caribbean Fisheries Institute, 15th Annual Session, November 1962, pp. 50-52, printed, April 1963. Gulf and Caribbean Fisheries Institute, Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

TUNA AND MACKEREL:

Preliminary Field Guide to the Mackerel- and Tuna-Like Fishes of the Indian Ocean (Scombridae)," by Bruce B. Collette and Robert H. Gibbs, 48 pp., printed, 1963, Smithsonian Institution, Washington, D. C. 20560.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

TUNA AND TUNALIKE:

The following articles appeared in Proceedings of the World Scientific Meeting on the Biology of Tunas and Related Species, La Jolla, California, 1962, FAO Fisheries Report No. 6, vol. 3, 1963. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Processed in English with French and Spanish summaries:

"Albacore scouting in the eastern North Pacific Ocean," by Leo Pinkas, pp. 1343-1353.

"The California albacore fishery logbook system," by William Craig, pp. 1217-1255, illus.

"California's tuna record gathering system," by Edward C. Greenhood, pp. 1367-1379, illus.

"Changes in availability of albacore in the eastern Pacific Ocean 1952 and 1958," by James H. Johnson, pp. 1227-1235, illus.

"Climatic parameters and the Hawaiian skipjack fishery," by Gunter R. Seckel, pp. 1201-1208, illus.

"Comparative distribution of eggs, larvae and adults in relation to biotic and abiotic environmental factors," by Hiroshi Yabe, Yoichi Yabuta, and Shoji Ueyanagi, pp. 979-1009, illus.

"A contribution to the biology of Philippine tunas," by Inocencio A. Ronquillo, pp. 1683-1752, illus.

"Distribution and abundance of tuna related to wind and ocean conditions in the Gulf of Tehuantepec, Mexico," by Maurice Blackburn, pp. 1557-1582, illus.

"Distribution and relative abundance of tunas in relation to their environment," by Taivo Laevastu, pp. 1835-1851, illus.

"Distribution of the yellowfin tuna Neothunnus macropterus (Temminck and Schlegel) in the tuna long-line fishing grounds of the Pacific Ocean," by Tadao Kamimura and Misao Honma, pp. 1299-1328, illus.

"Effects of water temperature on the distribution of some scombrid fishes along the Pacific coast of North America," by John Radovich, pp. 1459-1475, illus.

"A first examination of the abundance and distribution of yellowfin and albacore tuna in the western tropical Atlantic, 1957 to 1961," by Flavio Rodrigues Lima and John P. Wise, pp. 1515-1521, illus.

"Fishing techniques for tunas and skipjack," by Shigene Takayama, pp. 1067-1076.

"Food of Indian tunas," by P. T. Thomas and M. Kumaran, pp. 1659-1667, illus.

"Food of Pacific albacore in the California fishery (1955-1961)," by Harold B. Clemens and Robert A. Iselin, pp. 1523-1535, illus.

"Food of skipjack in the central Pacific," by Kenneth D. Waldron and Joseph E. King, pp. 1431-1457, illus.

"Future lines of tuna research, mainly in relation to fisheries oceanography," by Michitaka Uda, pp. 1087-1095.

"Growth and sexual dimorphism in growth of bigeye tuna (Thunnus obesus). A preliminary report," by Richard S. Shomura and Betty Ann Keala, pp. 1409-1417, illus.

"Investigation of tuna behavior by fish finder," by Minoru Nishimura, pp. 1113-1123, illus.

"The matter of availability and the harvest of tunas," by Gerald V. Howard, pp. 1041-1055, illus.

"Measurement of the shape of the tuna long-line and an analysis of its efficiency," by Chikamasa Hamuro, pp. 1133-1142, illus.

"A method for computing estimates and variances of relative log fishing powers of California albacore vessels," by Norman J. Abramson, pp. 1209-1215, illus.

"A method of sampling the Pacific albacore (Thunnus germo) catch for relative age composition," by David J. Mackett, pp. 1355-1366.

"A model of albacore migration in the north Pacific Ocean," by Harold B. Clemens, pp. 1537-1548, illus.

"Monofilament gill net fishing for skipjack tuna in Hawaiian waters. A progress report," by Richard S. Shomura, pp. 1177-1199, illus.

"An outline of the tuna longline grounds in the Indo-Pacific. Preliminary report," by Akira Suda, Tsutomu Koto, and Susumu Kume, pp. 1163-1176, illus.

"The past, present and future status of the tuna resources of the Trust Territory of the Pacific Islands," by Peter T. Wilson, pp. 1633-1638.

"Preliminary experiments with Tilapia as bait in the tuna fishery off the coast of Brazil," by Jose Bonifacio Gomes da Fonseca, pp. 1109-1112.

"Schooling behavior within aggregations composed of yellowfin and skipjack tuna," by Heeny S. H. Yuen, pp. 1419-1429, illus.

"Seasonal and annual variation of the hooking-rate and annual variation of the catch-quantity of tuna and marlin in the tropical Atlantic Ocean," by J. Nakagome and S. Suzuki, pp. 1279-1297, illus.

"Size and composition of tuna stocks," by Johs Hamre, pp. 1023-1039, illus.

"Spawning of the oceanic skipjack, Katsuwonus pelamis (Linnaeus), in the Laccadive Sea," by G. Raju, pp. 1669-1682, illus.

"Statistics of catch and effort required for scientific research on the tuna fisheries," by Milner B. Schaefer, pp. 1077-1086.

"Structure of the albacore stock and fluctuation in the catch in the North Pacific areas," by Akira Suda, pp. 1237-1277, illus.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Studies of oceanic fronts in the mouth on the Gulf of California, an area of tuna migrations," by Raymond C. Griffiths, pp. 1583-1605, illus.

"Subpopulation identification," by John C. Marr, pp. 1011-1021.

"Thermal relationships of tuna in the oceanic Northwest Atlantic," by James L. Squire Jr., pp. 1639-1657, illus.

"Tuna landings and production 1916-1961," by Edward C. Greenhood and Sterling P. Davis, pp. 1395-1407, illus. California tuna catch and production are compared with those of the United States and the world.

"Tuna tagging experiments in Norwegian waters," by Johs Hamre, pp. 1125-1132, illus.

"Tunas (genus Thunnus) of the western North Atlantic. III--Distribution and behavior of Thunnus species," by Frank J. Mather III, pp. 1159-1161.

"World-wide tuna research planning," by Wilbert McLeod Chapman, pp. 1097-1107.

Processed in French with English and Spanish summaries:

"Description des stades post-larvaires et juveniles de Neothunnus albacora (Lowe de l'Atlantique tropico-oriental" (Description of post-larval and juvenile stages of Neothunnus albacora (Lowe) of the eastern tropical Atlantic), by E. Marchal, pp. 1792-1811, illus.

Processed in Spanish with English and French summaries:

"Especies del genero Sarda en el Pacifico Oriental," (Species of the genus Sarda in the Eastern Pacific), by Aurora Chirinos de Vildosa, pp. 1549-1556, illus.

"La pesqueria del bonito en el Peru," (The bonito fisheries in Peru), by Felipe Ancieta, pp. 1607-1819, illus.

"Resultados del programa de marcado de atun en aguas espanolas" (Results of tuna-tagging plan in Spanish waters), by Julio Rodriguez-Roda, pp. 1813-1822, illus.

"Talla, peso, edad y crecimiento del atun del Golfo de Cadiz, Espana" (Length, weight, age and growth of tuna from Gulf of Cadiz, Spain), by Julio Rodriguez-Roda, pp. 1823-1834, illus.

UNDERWATER SOUNDS:

"An indication of underwater sound production by squid," by Robert T. B. Iversen, Paul J. Perkins, and Richard D. Dionne, article, Nature, vol. 199, no. 4890, July 20, 1963, pp. 250-251, printed. St. Martin's Press, Inc., 175 Fifth Ave., New York, N. Y. 10010.

UNITED STATES GOVERNMENT:

United States Government Organization Manual, 1964-65, 791 pp., illus., printed, revised June 1, 1964, $1.75. Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The official organization handbook of the Federal Government. Contains the Constitution of the United States and sections describing the agencies in the legislative, judicial, and executive branches of the Government as well as executive departments and independent agencies. Supplemental information includes brief discussions of quasi-official agencies, selected multilateral international organizations, selected bilateral organizations, charts of the principal Federal agencies, and appendices relating to abolished and transferred agencies and to Government publications. Also includes descriptions of agencies working in fisheries and related fields: Interagency Committee on Oceanography, U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, and Bureau of Sport Fisheries and Wildlife.

U.S.S.R.:

Fisheries Research in Russia, A Historical Survey, by P. G. Borisov, OTS 63-11121, 192 pp., illus., processed, 1964, $2.00. (Translated by Malkah Raymist from the Russian, Gosudarstvennoe Izdatel'stvo "Vysshaya Shkola," Moscow, 1960.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Hydroacoustical Station Paltus, U.S.S.R., by V. P. Averkiyev, OTS 64-31276, 32 pp., illus., processed, May 18, 1964, 75 cents. (Translated from the Russian, Sudovyye Rybopoiskovyye i Elektronavigatsionnyye Pribory, 1963.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Materialy Rybokhoziastvennykh Issledovanii Severnogo Basseina--Vypusk II (Fishery Research in the Northern Basin, Part 2), 170 pp., printed in Russian, 1964. Gosudarstvennyi Komitet po Rybnomu Khoziaistvu pri SNKH SSSR; Poliarnii Nauchno-Issledovatel'skii i Proiektnyi Institut Morskogo Khoziaistva i Okeanografii im. N. M. Knopovicha PINRO), Murmansk, U.S.S.R. Includes, among others, articles on: "Forecasting of the natural basis for the trawl fishery in the central elevation area of the Barents Sea," by K. G. Konstantinov; "Assessment of abundance of single year-classes of Atlantic Scandinavian herring," by I. G. Judanov; "Sizes of mature cod in the Arcto-Norwegian stock in 1959, 1960 and 1961," by A. S. Baranenkova and N. S. Khokhlina; "Some peculiarities in menhaden morphology," by E. E. Gusev; "Dynamics of age composition, maturation and spawning of cod on the Flemish Cap Bank," by A. I. Postolaky; "Results of estimation of the abundance of young cod and haddock in the Barents Sea in Winter 1962/63," by Z. P. Baranova and G. P. Nizovtsev; "Influence of transportation conditions on the future state of eggs and larvae of the Far East salmons," by L. A. Galkina; "Distribution of seals in the Jan-Mayer area and hydrometeorological conditions in the fishing period of 1963," by V. A. Potelov and F. L. Seleznev; "On the distribution of shrimps in the Labrador and Newfoundland areas," by V. I. Mikhalkovich; "Influence of the trawling speed upon the catchability of the bottom trawl," by E. I. Zaitsev; "On the use of fish finders," by O. I. Chatoba and M. N. Shcherbino; "The use of echo sounder when fishing under ice," by A. A. Ganjkov and O. N. Kiselev; and "To the

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

problem of increase in profitableness of the trawl fishery in the Barents Sea," by V. I. Zakurdaev.

Transactions of the Murmansk Marine Biological Institute, FTD TT-63-663, 396 pp., printed, January 27, 1964, $5. (Translated from the Russian, Akademiya Nauk SSSR, Murmanskii Morskoi Biologicheskii Institut, vol. 3, no. 7, 1961, pp. 1-220.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230. Contents: procedure for the collection of phytoplankton; ways in which crustaceans adapt to changes in the chemical nature of the external environment; the survival rate of humpbacked salmon (Oncorhynchus gorbuscha Walb.) fry in relation to the mode of transfer from fresh to sea water; active selective reaction of humpbacked salmon fry in relation to sea water; pigment reaction of the cod to uniform and nonuniform backgrounds; the migrations of sexually immature cod and the reasons for variations in them; and other studies.

Trudy PINRO, Vypusk 15, 1963--Akklimatizatsiia Tikhookeanskikh Lososei v Basseine Barentseva i Belogo Morei; Materialy po Biologii Treski i Morskikh Mlekopitaiushchikh Severa (Acclimatization of Pacific Salmon in Barents and White Sea Basins; Biology of Cod and Marine Mammals of the Soviet North), 286 pp., printed in Russian. Poliarnii Nauchno-Issledovatel'skii i Proiktnyi Institut Morskogo Khoziaistva in Okeanografii im. N. M. Knipovicha, Moscow, U.S.S.R. Includes, among others, these articles: "Data on the acclimatization of pink salmon in the basin of the Barents and White Seas," by V. V. Azbelev and A. A. Jakovenko; "Experiments on regulation of the maturing of pink salmon," by O. B. Sakun, and G. M. Persov; "Observations on seaward migration of young pink and chum salmon in the European north," by E. L. Bakshtansky; "Rearing of young pink and chum salmon in sea water," by E. L. Bakshtansky; "On the variability of the pink salmon selective reaction to sea water," by G. D. Bocharov; "Cod of the Murman Coast," by T. I. Glebov; "Observations on the feeding of cod and haddock in the Barents Sea," by N. S. Novikova and V. I. Nikhalkovich; "Some features of the capelin ecology (Mollotus villosus villosus Muller) in the Barents Sea," by V.S. Prokhorov; "The autumn-winter distribution of prespawning and spawning concentrations of polar cod (Boreogadus saida, Lepechin) in the Barents Sea," by V. P. Ponomarenko; "Materials on the biology and fishery of the Newfoundland harp seal," by R. Sh Khuzin; "On the distribution and biology of the Greenland hooded seal," by R. Sh. Ghuzin and M. Ja. Jakovenko; and "Age determination and data on the breeding whale," by R. Sh. Khuzin.

VENEZUELA:

Foreign Trade Regulations of Venezuela, OBR 64-73, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20402. To encourage domestic industry, tariff and nontariff controls are utilized to protect domestic manufacturers from foreign competition by restricting imports of competing commodities, and to stimulate investment and expansion by permitting the relatively unrestricted entry of capital goods and primary materials required for production. All exports of Venezuelan origin are free of duties. This report discusses, besides trade policy, Venezuela's import tariff system, sales and other internal taxes, documentation and fees, labeling and marking requirements, and special customs provisions. Also covers her nontariff trade controls, export regulations, United States import and export controls, and diplomatic representation between the two countries.

VITAMIN A:

"On the factors of isomerization of vitamin A in fish liver oil," by H. Baba, article, Japanese Journal of Nutrition, vol. 21, 1963, p. 3, printed. Daiichi Shuppan K.K., 39, 1-chome, Kanda Jimbo-cho, Chiyoda-ku, Tokyo, Japan.

"Growth effect of vitamin A in fish liver oil on chicks," by H. Baba, article, Japanese Journal of Nutrition, vol. 21, 1963, p. 8, printed. Daiichi Shuppan K.K., 39, 1-chome, Kanda Jimbo-cho, Chiyoda-ku, Tokyo, Japan.

WEATHER CHARTS:

The following processed weather charts, 2 pp. each, are published by the Weather Bureau, U. S. Department of Commerce, Washington, D. C., and are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane warnings, explanations of warning displays, and schedules of AM and FM radio and TV stations that broadcast weather forecasts and warnings.

Coastal Warning Facilities Chart, Cape Hatteras, N.C., to Brunswick, Ga., 1964.

Coastal Warning Facilities Chart, Eastport, Me., to Montauk Point, N. Y., 1964.

Coastal Warning Facilities Chart, Manasquan, N. J., to Cape Hatteras, N. C., and Chesapeake Bay, 1964.

Coastal Warning Facilities Chart, Montauk Point, N.Y., to Manasquan, N. J., 1964.

Coastal Warning Facilities Chart, Puerto Rico and Virgin Islands, 1964.

Small Craft, Gale, and Whole Gale Warning Facilities Chart, Great Lakes: Huron, Erie, and Ontario, 1964.

Small Craft, Gale, and Whole Gale Warning Facilities Chart, Great Lakes: Superior and Michigan, 1964.

WEST AFRICA:

Foreign Trade Regulations of the West African Customs Union (Dahomey, Ivory Coast, Mali, Mauritania, Niger, Senegal, Upper Volta) and Togo, by G. Michael Bache, OBR 64-60, 12 pp., printed, June 1964, 15 cents. Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Each member of the Union (Dahomey, Ivory Coast, Mali, Mauritania, Niger, Senegal, and Upper Volta) has a commercial agreement with France which provides that France will furnish economic assistance in certain specified forms. In return, the member of the Union undertake to buy certain commodities from France and the franc zone either exclusively or in a

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

specified percentage. Togo has entered into a similar agreement with France. This leaflet presents information on the import tariff system, sales and other internal taxes, documentation and fees, mail shipments, and labeling and marking requirements of those African countries. Also covers special customs provisions, nontariff import controls, export controls, United States foreign trade controls, and diplomatic representation between those countries and the United States.

"Résultats préliminaires de la campagne Thalassa au large du Rio de Oro et de la Mauritanie" (Preliminary results of the fishing expedition of Thalassa off the coasts of Rio de Oro and Mauritania), by Cl. Maurin, article, Science et Peche, no. 112, 1963, 12 pp., illus., printed in French. L'Institut Scientifique et Technique des Peches Maritimes, 59 Ave. Raymond-Poincare, Paris 16e, France.

WHALE OIL:
"Composition of spermaceti," by M. Wellendorf, article, Nature, vol. 198, no. 4885, 1963, pp. 1086-1087, printed. St Martin's Press, Inc., 175 Fifth Ave., New York, N. Y. 10010.

WHALES:
"Progress report on biological studies of the larger cetacea in the waters off California," by Dale W. Rice, article, Norsk Hvalfangst-Tidende, no. 7, 1963, pp. 181-187, printed. Hvalfangerforeningen, Sandefjord, Norway.

WHALING:
"Pacific Coast whaling and whale research," by Dale W. Rice, article, Transactions of the Twenty-Eighth North American Wildlife and Natural Resources Conference, March 4, 5, and 6, 1963, pp. 327-335, printed. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

WHITING:
"Effect of chilled storage on the frozen storage life of whiting," by J. A. Peters, E. H. Cohen, and F. J. King, article, Food Technology, vol. 17, no. 6, June 1963, pp. 109-110, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

YELLOW PIKE:
"The movement, heterogeneity, and rate of exploitation of walleyes in northern Green Bay, Lake Michigan, as determined by tagging," by Walter R. Crowe, Earnest Karvelis, and Leonard S. Joeris, article, Conseil Permanent International pour l'Exploration de la Mer, Rapports et Proceedings-Verbaux des Reunion, vol. 370, 1963, pp. 38-41, printed. Conseil International pour l'Exploration de la Mer, Charlottenlund Slot, Charlottenlund, Denmark.

RUSSIAN THEORIES ON THE INFERIOR QUALITY OF HATCHERY-REARED CHUM SALMON FRY

A Russian fishery scientist has proposed some interesting theories concerning the often discussed inferior quality of hatchery-reared fry. His conclusions were based on observations of the chum salmon (Oncorhynchus keta), but might also apply to other salmonids.

According to N. N. Disler, hatchery fry emergent on the flat surface of trays or troughs occur in a head-down position. This causes the oil droplet of the yolk sac to occupy an unnatural posterior position where it causes temporary deformation of the intestine and prevents the passage of food. Disler further contends that, because of the nature of the artifical environment, hatchery fry begin to swim at an earlier age than wild fry. As a result of the exhausting movements of the hatchery fry, the fat content of their bodies--after all the yolk material has been absorbed--is only one-fourth that of wild fry.

In order to avoid defects in the structure and behavior of hatchery fry, Disler recommends that the facilities for holding young chum salmon should more nearly approximate the natural environment. He suggests that several layers of large pebbles should be spread on the bottom of the holding containers, and water should be introduced from the bottom through the pebbles.

A translation of Disler's paper entitled "Development of Autumn Chum Salmon in the Amur River" can be obtained for 50 cents from the Office of Technical Services, U. S. Department of Commerce, Washington, D. C. (The Progressive Fish-Culturist, July 1964.)

14,000-FOOT MOUNTAIN DISCOVERED IN PACIFIC

The discovery of an undersea mountain in the Pacific Ocean comparable to Mt. Whitney, the tallest in the United States outside Alaska, was disclosed on August 25, 1964, by the Coast and Geodetic Survey, U. S. Department of Commerce.

The new discovery was made July 23, by the C&GS Ship Pioneer while on a six-months international scientific expedition to the Indian Ocean. The 30,000-mile cruise of the 312-foot "floating laboratory" ended August 11 when the ship returned to its home port of Oakland, Calif. Its findings will take years for scientists to evaluate.

The undersea mountain showed up on the vessel's depth-sounding equipment about 175 miles south of Wake Island, between Hawaii and Guam, where the ocean is almost 3½ miles deep. Although it was 3,800 feet below the surface of the sea, it rose at least 14,130 feet above the ocean floor. California's Mt. Whitney, in the Sierra Nevada Mountains, is 14,495 feet high.

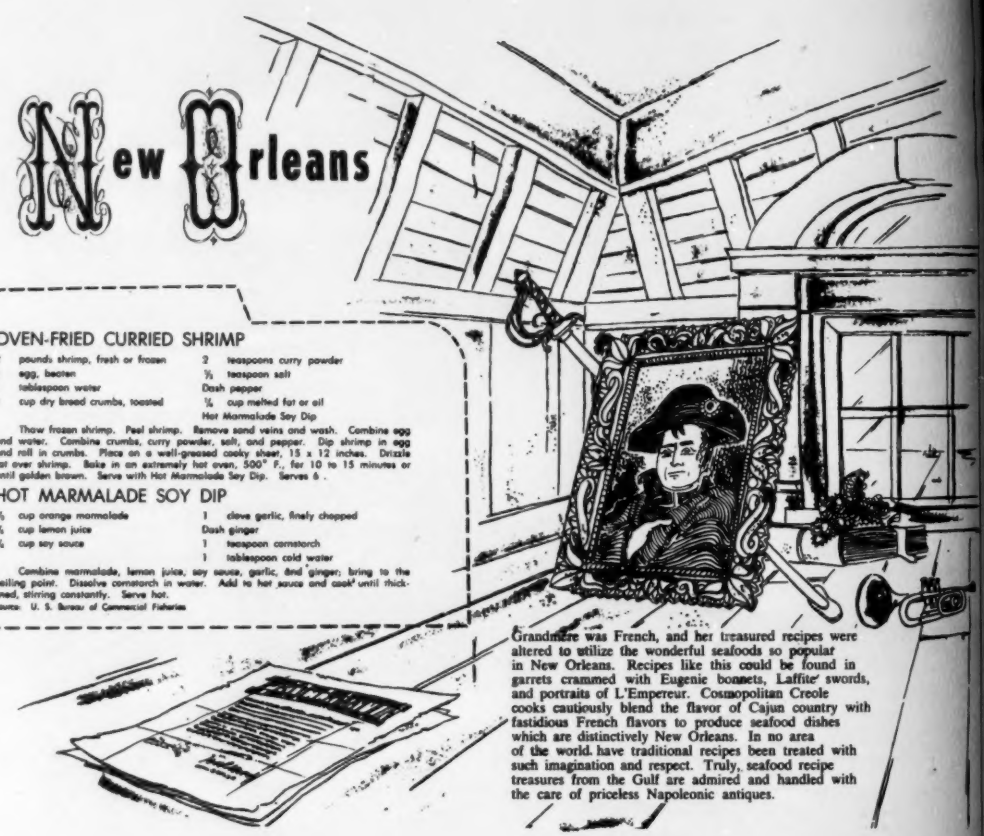
The commanding officer of the Pioneer said the undersea mountain (termed a seamount by oceanographers) could be taller than the height recorded. "We sailed over it only once," he explained, "and the site where we recorded 14,130 feet may not have been the highest point."

A C&GS oceanographer (who participated in the Indian Ocean expedition) said the seamount was formerly an island which probably sank beneath the ocean about 50,000,000 years ago. He said, "The seamount is similar to any one of the Hawaiian Islands, but this one sank beneath the ocean over a great period of time because of its enormous size. The crust of the ocean bottom is just not sufficiently strong to withstand a load of such dimensions. The new seamount is probably an extinct volcano like so many others in the Pacific Basin. They seem to form in groups on long linear rises or swells of the sea floor crust. Lava is spewed out above hot spots in the earth's mantle, that part of the earth's interior which surrounds the central core." He further stated that the seamount was "a new mountain, geologically speaking," adding that "the great mystery of Pacific seamounts is why we can not find any really old ones. Unlike mountains on land, seamounts are shielded from erosion," explained the oceanographer, "so, like mountains on the moon, they should last virtually forever."

Seamounts have a practical importance aside from their interest to scientists. For ships, most of which are now equipped with sounding devices, they furnish a method for establishing a fixed position on the often trackless sea. The location of seamounts, especially those which are not too far below the surface of the ocean, is also of strategic importance to submarines.

The new seamount will probably be named and its position will subsequently appear on nautical charts.

New Orleans



OVEN-FRIED CURRIED SHRIMP

2	pounds shrimp, fresh or frozen	2	teaspoons curry powder
1	egg, beaten	½	teaspoon salt
1	tablespoon water	Dash	pepper
1	cup dry bread crumbs, toasted	¼	cup melted fat or oil

Hot Marmalade Soy Dip

Thaw frozen shrimp. Peel shrimp. Remove sand veins and wash. Combine egg and water. Combine crumbs, curry powder, salt, and pepper. Dip shrimp in egg and roll in crumbs. Place on a well-greased cooky sheet, 15 x 12 inches. Drizzle fat over shrimp. Bake in an extremely hot oven, 500° F., for 10 to 15 minutes or until golden brown. Serve with Hot Marmalade Soy Dip. Serves 6 .

HOT MARMALADE SOY DIP

½	cup orange marmalade	1	clove garlic, finely chopped
½	cup lemon juice	Dash	ginger
¼	cup soy sauce	1	teaspoon cornstarch
		1	tablespoon cold water

Combine marmalade, lemon juice, soy sauce, garlic, and ginger; bring to the boiling point. Dissolve cornstarch in water. Add to hot sauce and cook until thickened, stirring constantly. Serve hot.

Source: U. S. Bureau of Commercial Fisheries

Grandmère was French, and her treasured recipes were altered to utilize the wonderful seafoods so popular in New Orleans. Recipes like this could be found in garrets crammed with Eugenie bonnets, Laffite' swords, and portraits of L'Empereur. Cosmopolitan Creole cooks cautiously blend the flavor of Cajun country with fastidious French flavors to produce seafood dishes which are distinctively New Orleans. In no area of the world have traditional recipes been treated with such imagination and respect. Truly, seafood recipe treasures from the Gulf are admired and handled with the care of priceless Napoleonic antiques.

--"Heirloom Seafood Recipes to Treasure," Special Fisheries Marketing Bulletin, U. S. Bureau of Commercial Fisheries, Washington, D. C.